TECHNOLOGY DEPT.

ELECTRICAL REVIEW

FOUNDED 1872

CXXXVIII. No. 3565 MARCH 22, 1946 9d. WEEKLY

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DETROIT

"NOW, REGARDING OUR LIGHTING PLANS . . ."

LIGHTING ADVISORY SERVICE *All concerned with the installation or renewal of lighting are invited to communicate with our Lighting Advisory Service, Bridle Path, Watford. Phone* 5811.

THE importance of planned lighting cannot be exaggerated. Sufficient light is not enough. Modern practice takes heed of the *psychological* and *æsthetic* aspects as well as the "fitness-for-purpose" of a lighting installation. Appearance, quality, accessibility, economy are other vital considerations ranging far beyond the question of actual light. *All are catered for by the famous Mazda range of lamps and fittings.*

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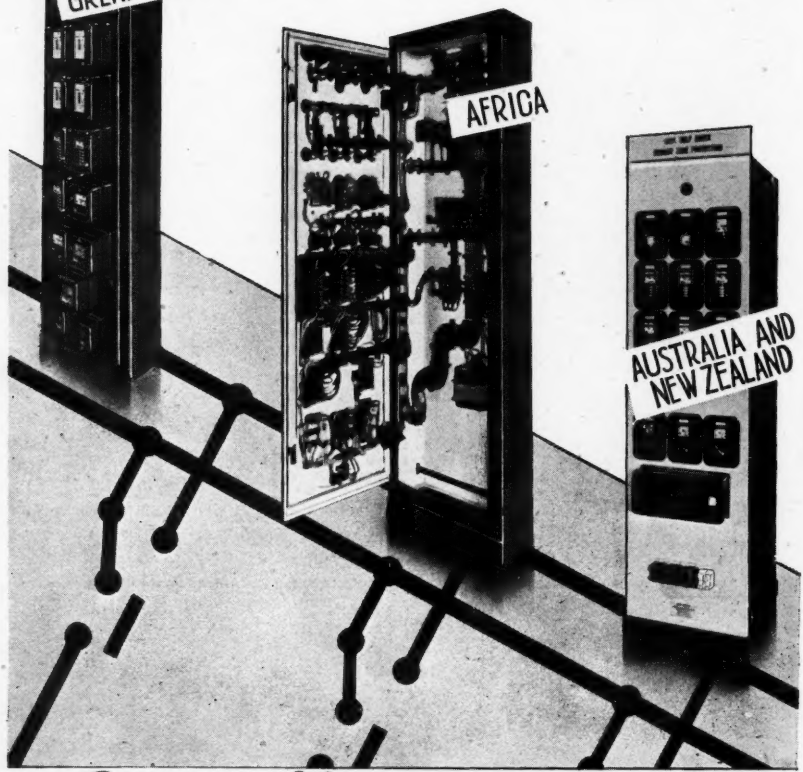
REYROLLE EQUIPMENT IS PROTECTING
BUSBARS AND BUSBAR-ZONES STABLY
AND EFFECTIVELY THE WORLD OVER



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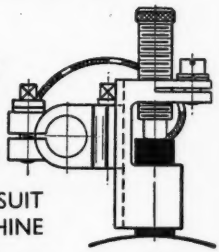

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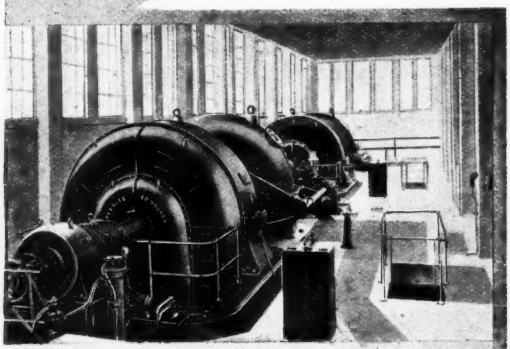
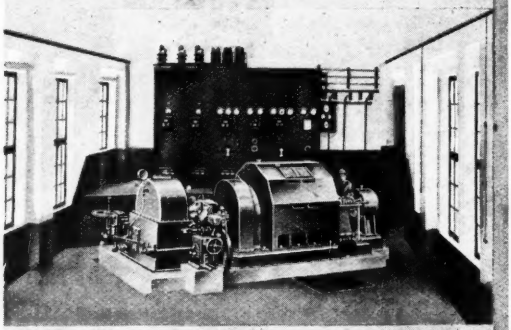
HORIZONTAL & VERTICAL TYPES
DESIGNED TO INDIVIDUAL SPECIFICATIONS



A New Zealand Hydro-Electric Power Station showing two 8850 K.V.A. ·85 power factor 6600/7000 volt 500 r.p.m. A.C. Generators.
Four 1750 K.V.A. Generators and three 150 K.W. Exciter Sets of Bruce Peebles manufacture are also installed in this station.



A 2500 K.V.A. ·85 power factor 6600 volt. 1000 r.p.m. A.C. generator, installed in a Bolivian Hydro-Electric Power Station.

First in the Field

The first hydro-electric installation of any real size in Great Britain, notably the Snowdon Scheme, was carried out in its entirety by Bruce Peebles. That was in 1904.

And so more than 40 years ago a great tradition had its birth. The Company has gone steadily ahead in the fulfilment of that tradition.

The machines represent the highest standards of modern practice, and possess many important features, including the structural advantages resulting from fabricated steel construction.

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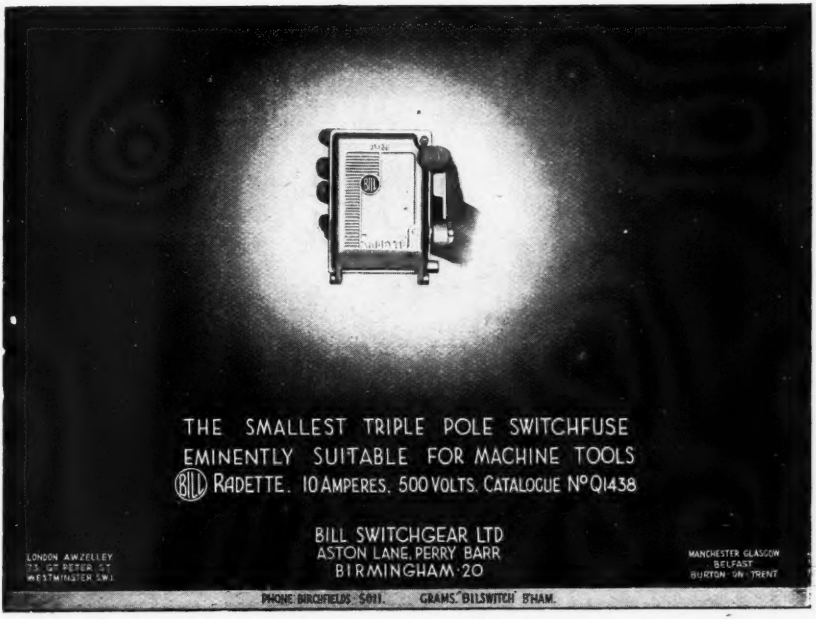
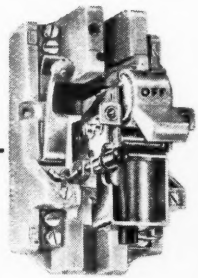


SIEMENS

EARTH LEAKAGE CIRCUIT BREAKERS



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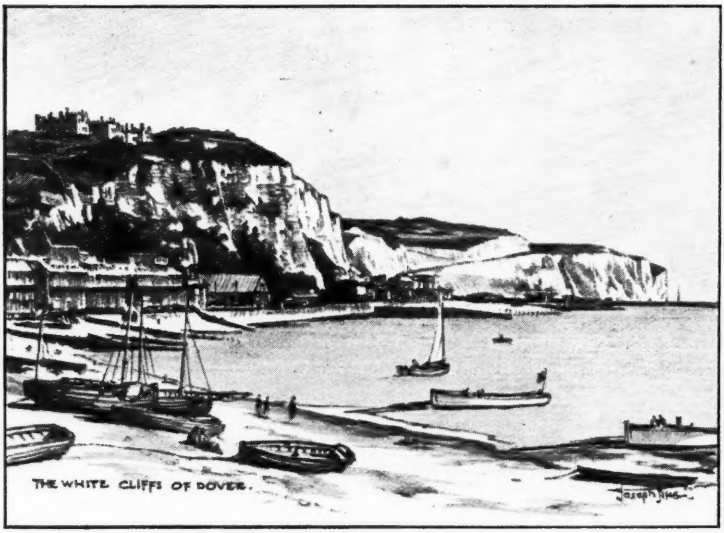

THE WHITE CLIFFS OF DOVER

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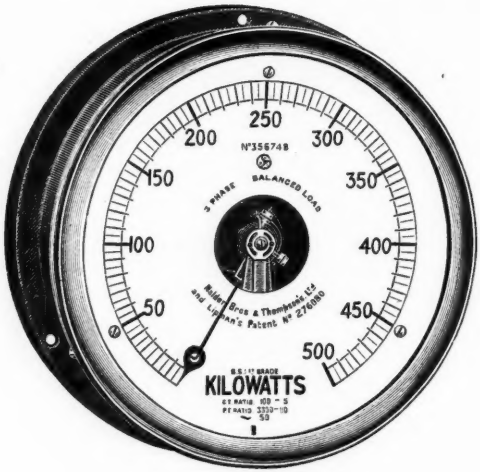

The Wattmeter shown is typical of N.C.S. Long Scale Induction Instruments for the measurement of alternating currents, Ammeters and Voltmeters being sold at the same prices as moving iron types for equivalent scale lengths. Sizes range from 2½" to 20" diameter dials, every instrument being strong, accurate, efficient and well finished, its performance fully guaranteed by Nalders' experience and reputation.

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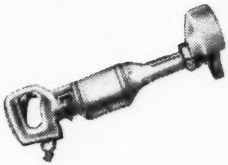

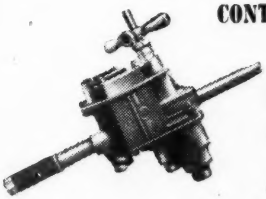

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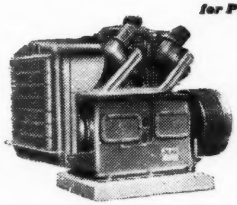

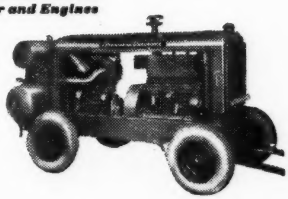

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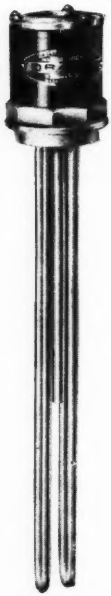

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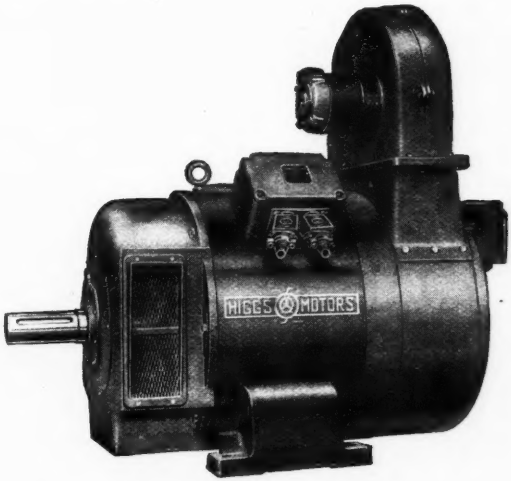

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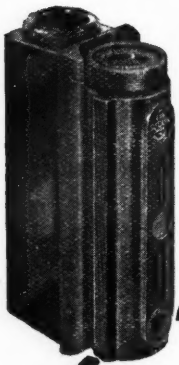

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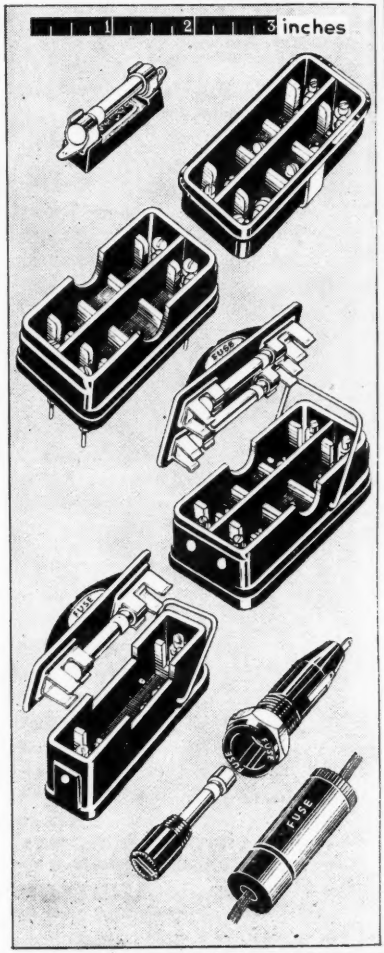

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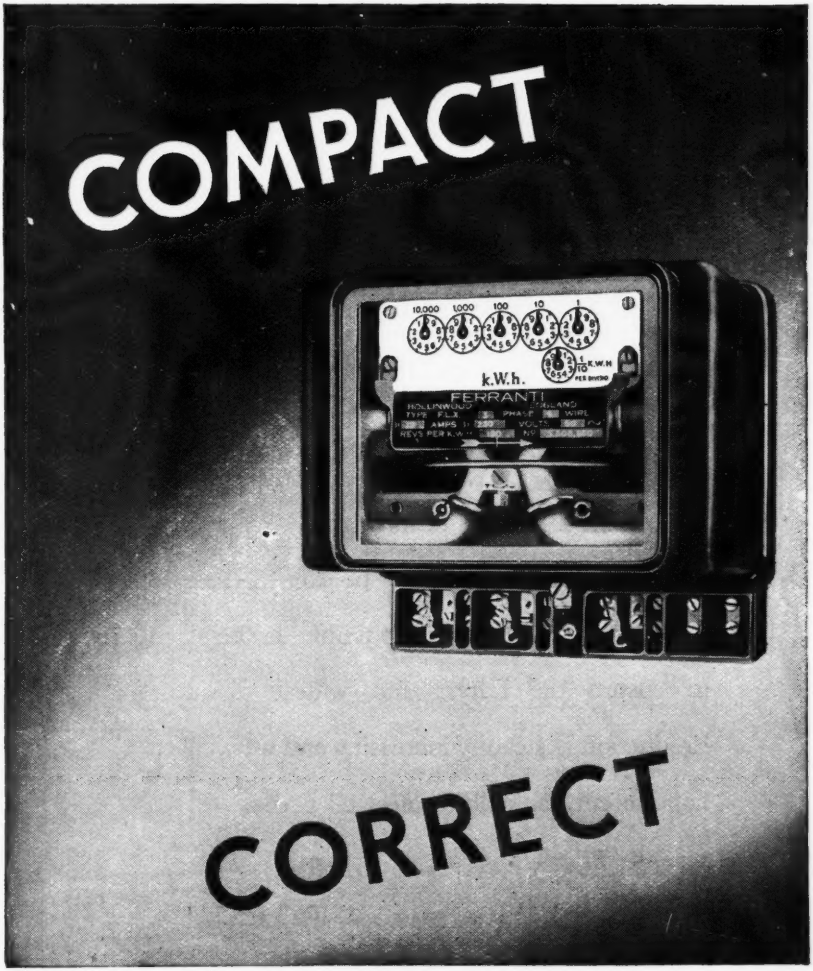

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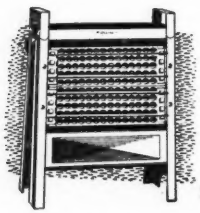

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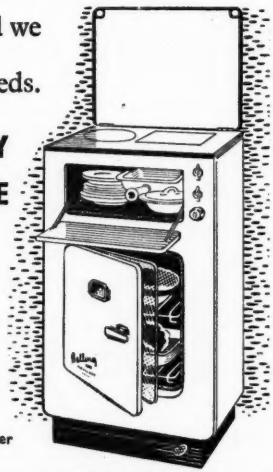

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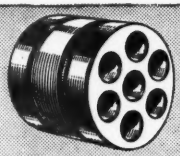
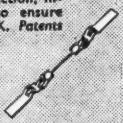


Barrel constructed of special ceramic. Ends precision ground to form perfect bedding for spun-on end caps

Fuse Element of special construction, incorporating patented features to ensure low working temperature. (*U.K. Patents Nos. 466525 and 467684*).



Special lattice construction of fuse elements allows full advantage to be taken of arc-quenching properties of graded quartz filling.

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HENLEY'S were the pioneers of the Short Break Cartridge Fuse for use in underground network boxes. The design of HENLEY H.R.C. Cartridge fuses is based on accumulated practical experience and continuous technical study. Every HENLEY H.R.C. Cartridge Fuse is a scientifically constructed piece of precision apparatus, efficient in operation and thoroughly reliable.

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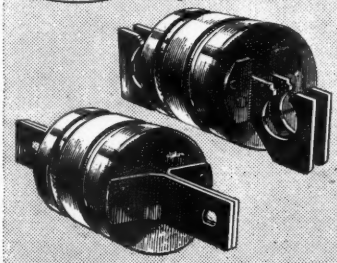
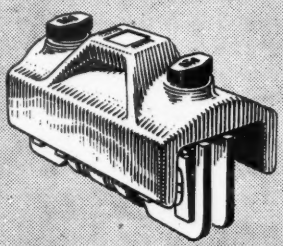


Outer end caps, forced on under heavy pressure and electrically soldered in position can be fitted with wedge type contacts *(upper illustration)* or bolted type contacts *(lower illustration)*.



H. R. C. Cartridge Fuse fitted to a porcelain carrier as used in ISCO Ironclad Service Fuses, etc.

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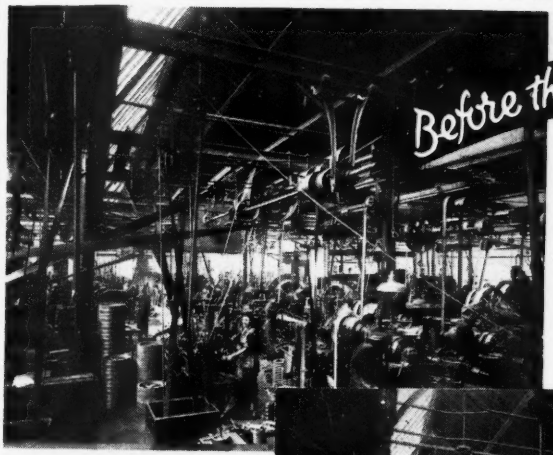
PLANT MOTORISATION

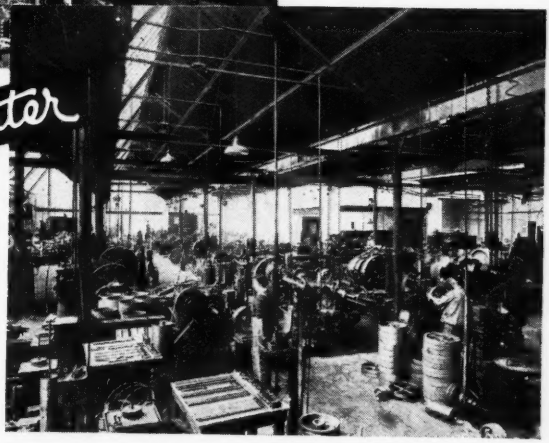
USING 'ENGLISH ELECTRIC' MOTORS AND OVERHEAD BUS-BAR SYSTEM



Before the Changeover

View in a factory containing 105 belt driven machine tools.

One Week Later



105 machine tools changed over to individual motor drive, including all electrical connections and motorisation of the machines.

This changeover is fully described in our publication entitled 'PLANT MOTORISATION'

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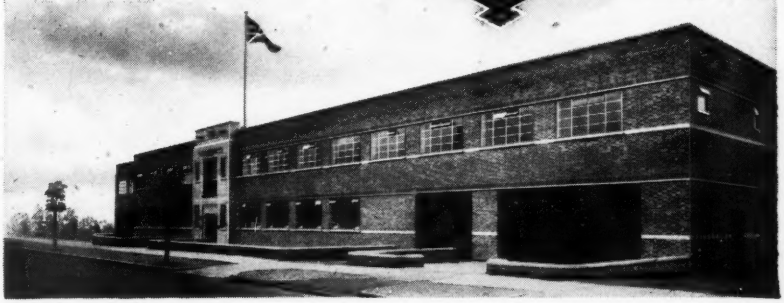
Will our many friends please note, that whilst the above named Company will feature in future advertising, it is purely a subsidiary of the parent Company, having a nominal capital only.

BRITMAC



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Glasgow Office: GRESHAM CHAMBERS, 45 WEST NILE STREET, GLASGOW, C.1. Telephone: Central 9106

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Gloucester Corporation Electricity Dept.
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The cables used for the 500 independent runs were manufactured and installed by Standard Telephones and Cables Limited.

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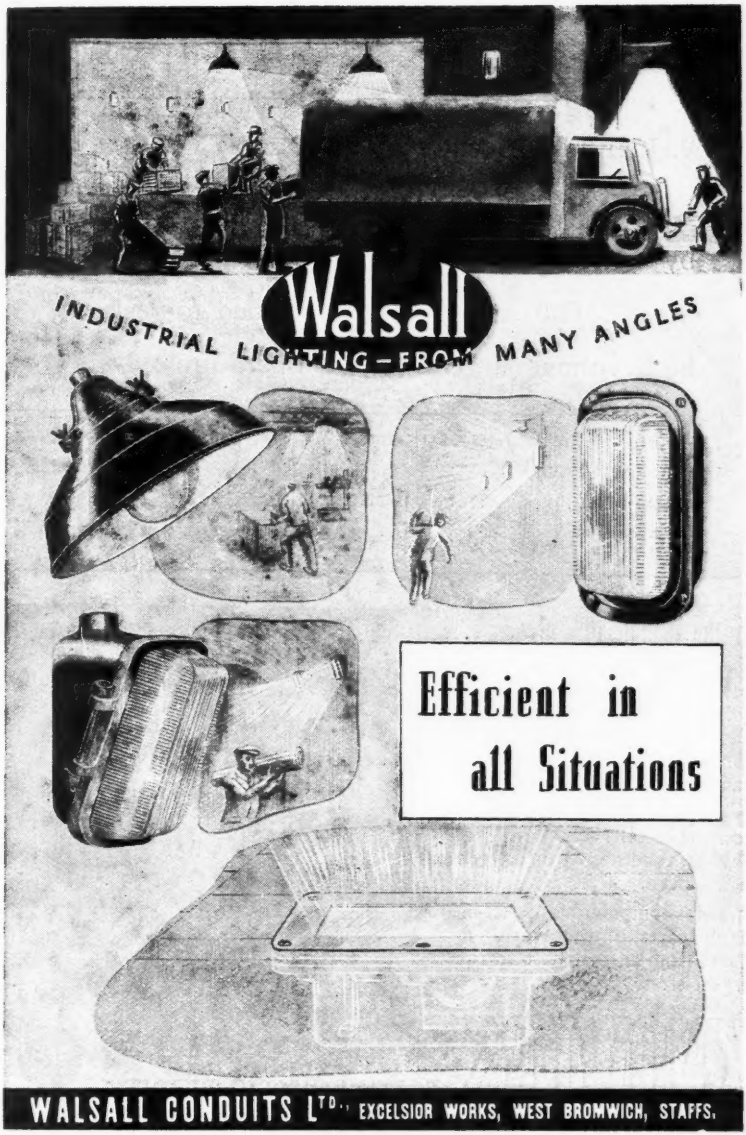
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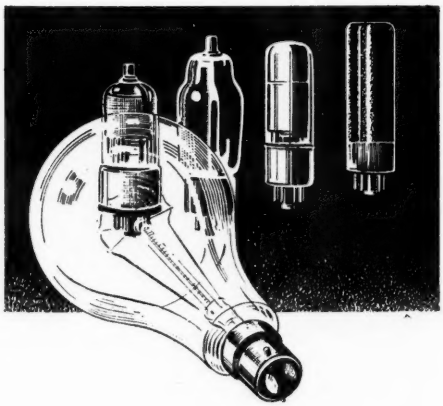

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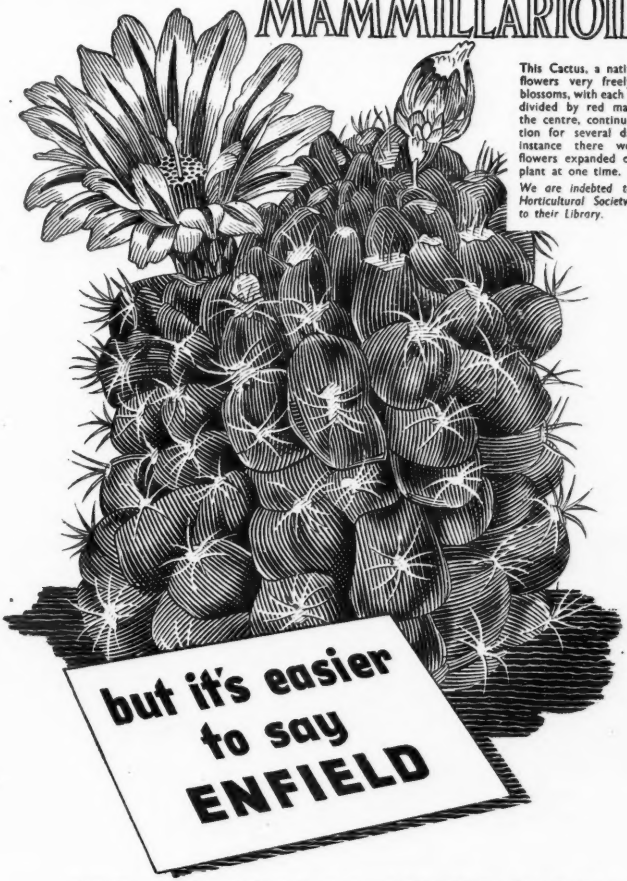

This Cactus, a native of Chile, flowers very freely, and its blossoms, with each yellow petal divided by red marking down the centre, continue in perfection for several days. In one instance there were sixteen flowers expanded on the same plant at one time.

We are indebted to the Royal Horticultural Society for access to their Library.

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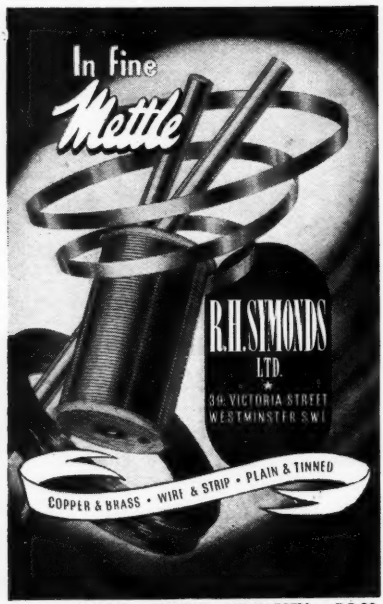

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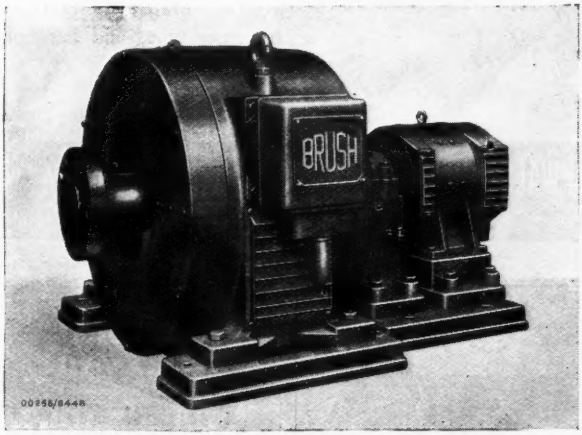

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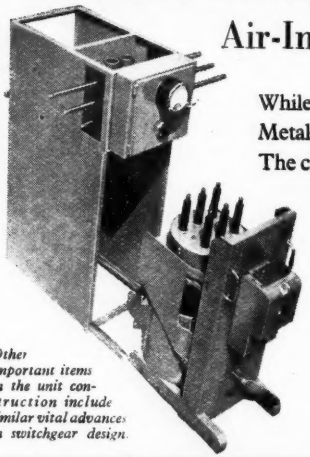

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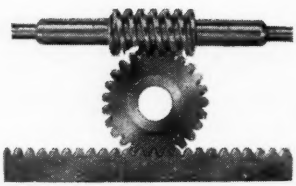

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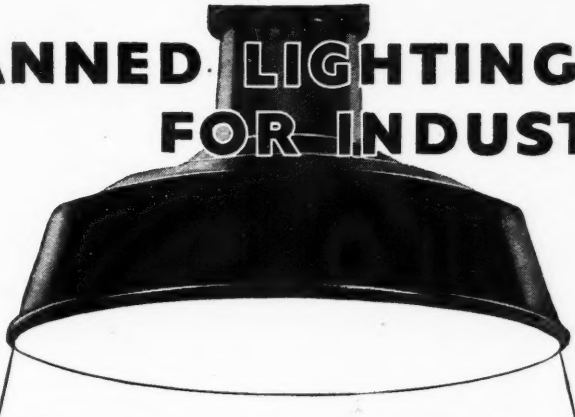

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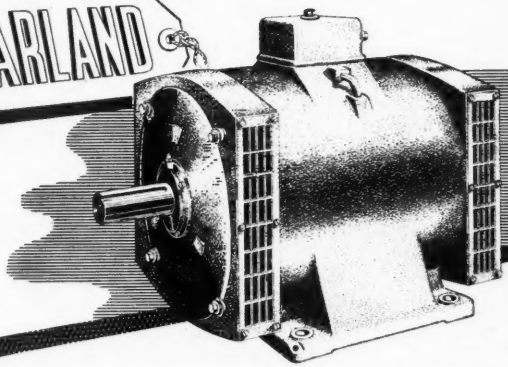

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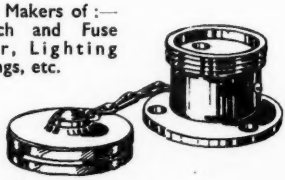

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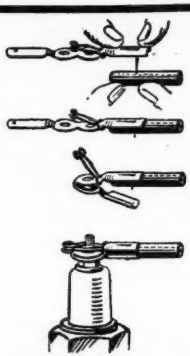

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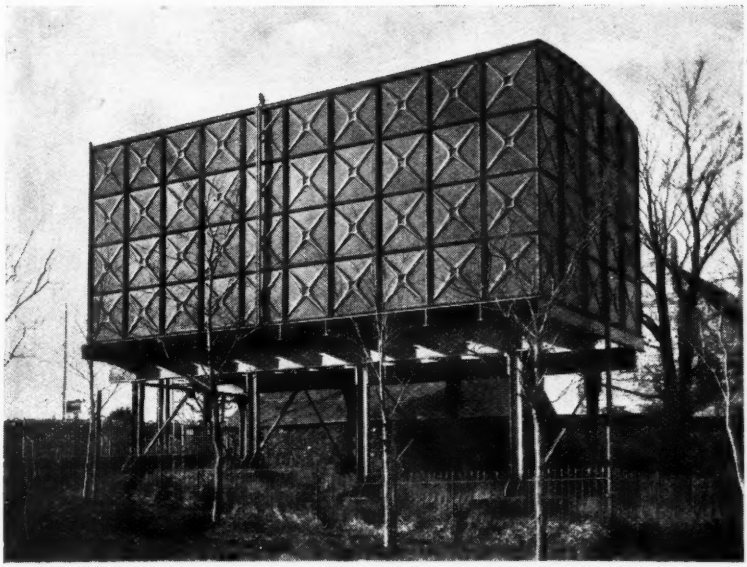

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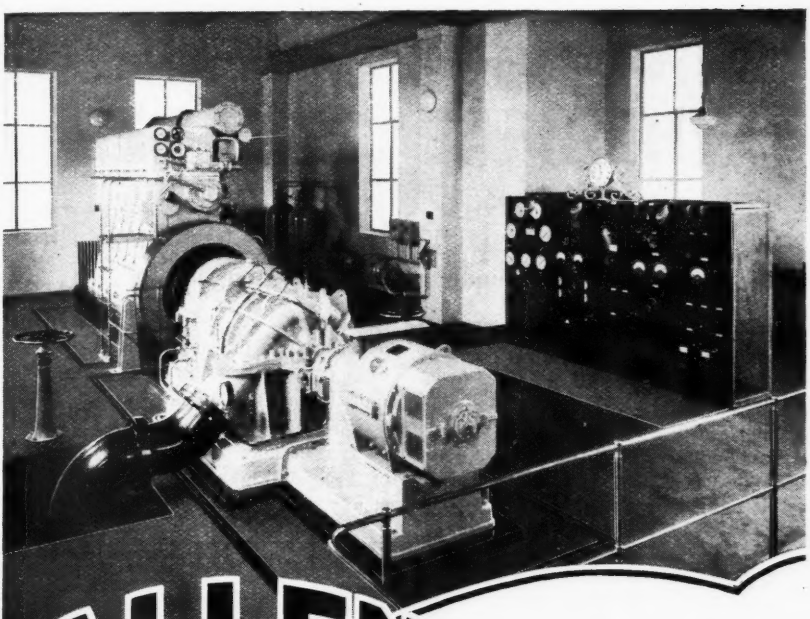

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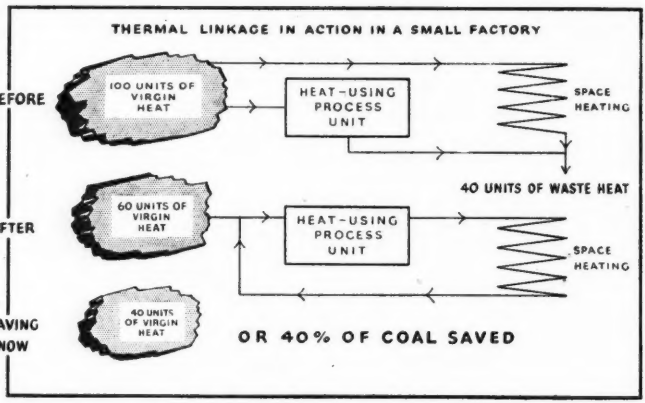

The *Fuel Efficiency Bulletins* of the Ministry of Fuel and Power are an essential part of the "blue printing" of every programme of reconstruction and conversion of plant. Have you the full set of appropriate Bulletins? Have they been combed afresh for new ideas on planned fuel efficiency?

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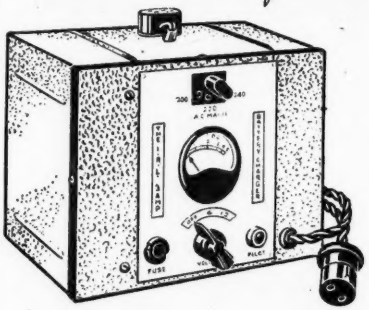

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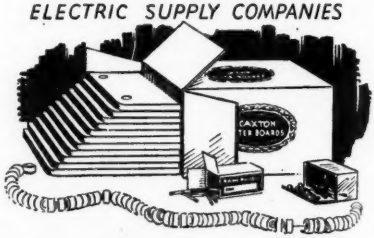

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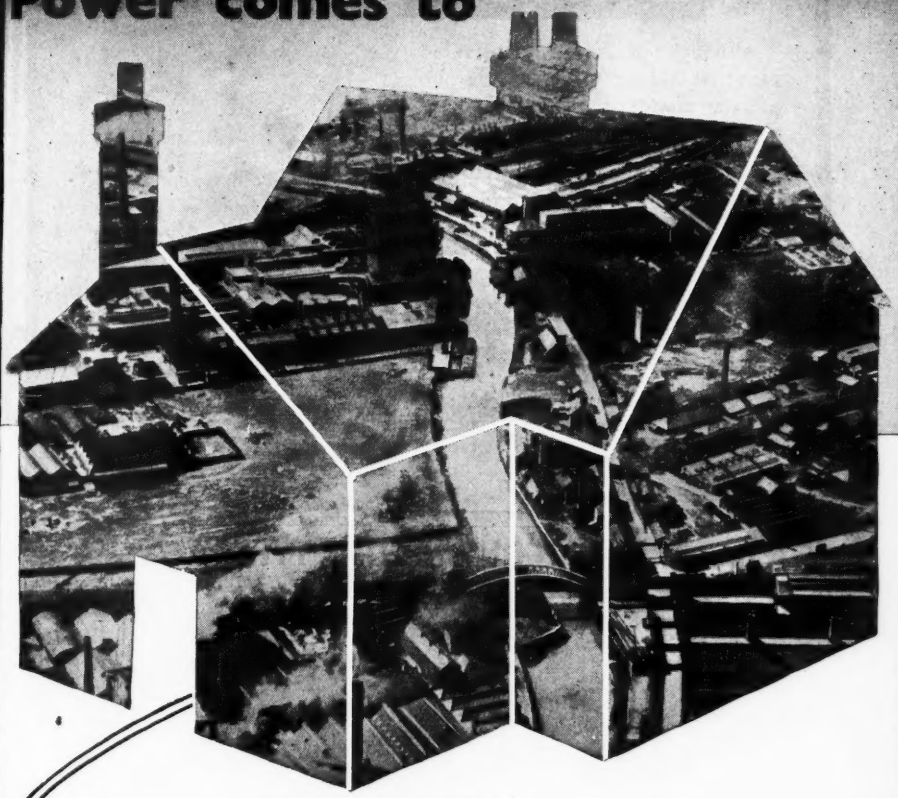

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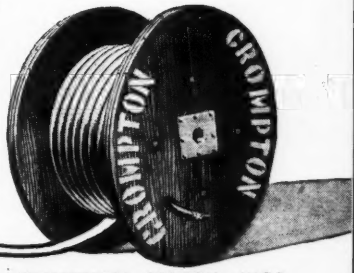

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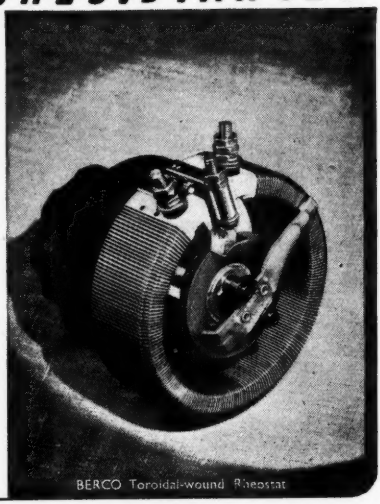

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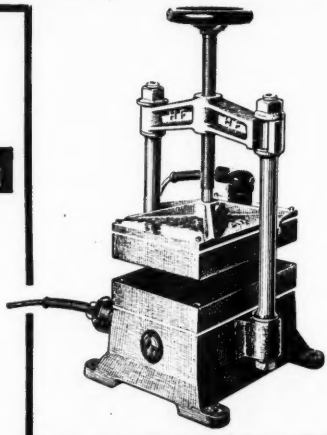

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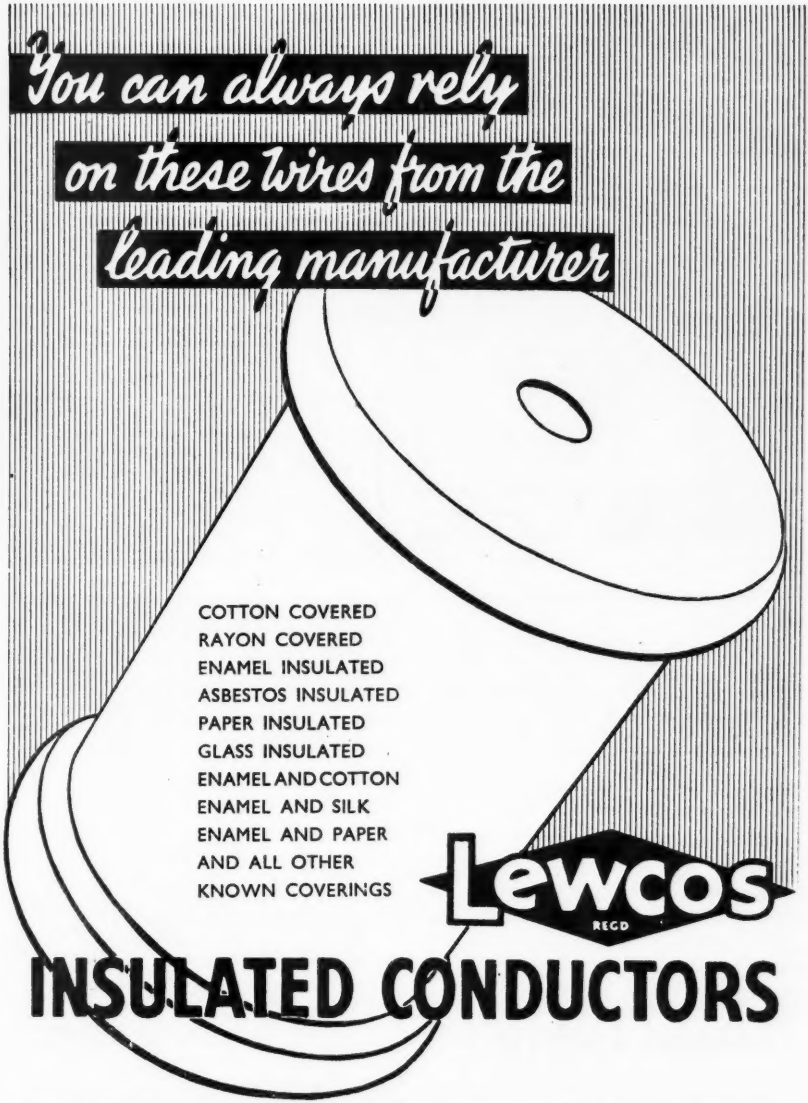

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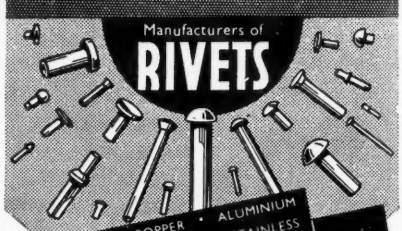

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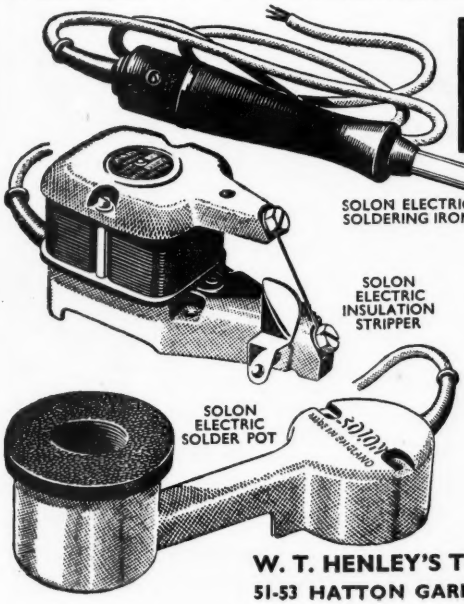

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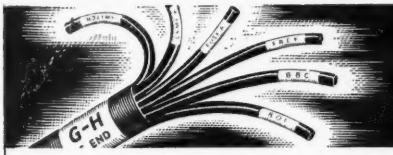

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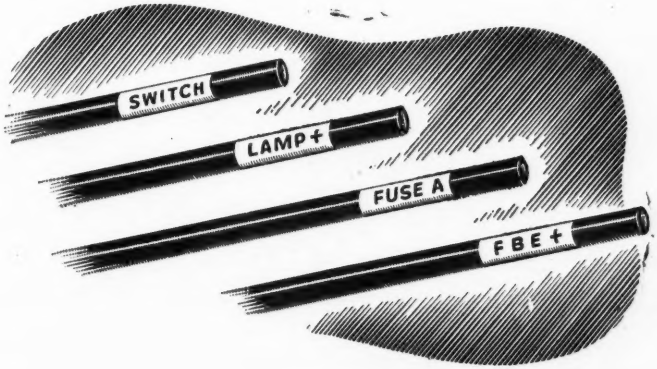

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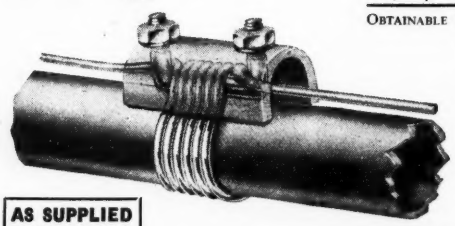

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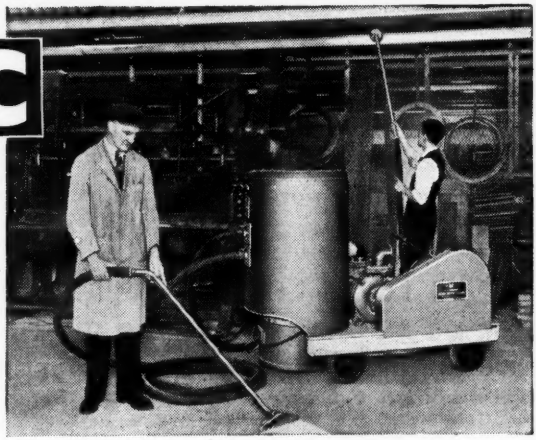

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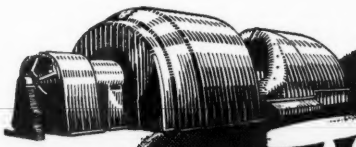

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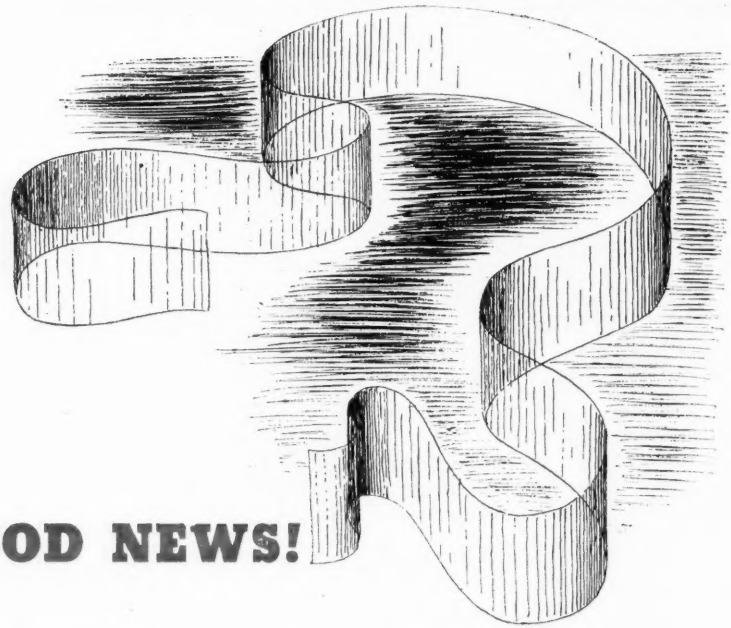

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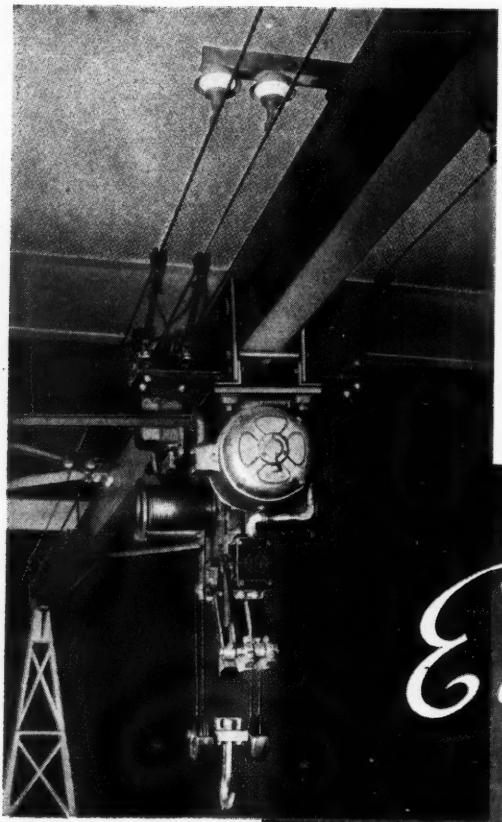

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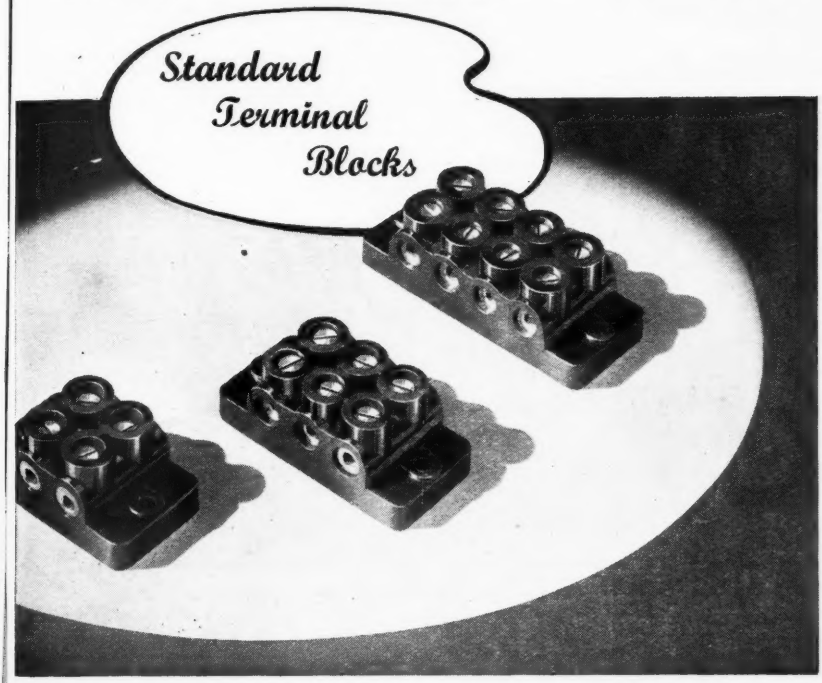

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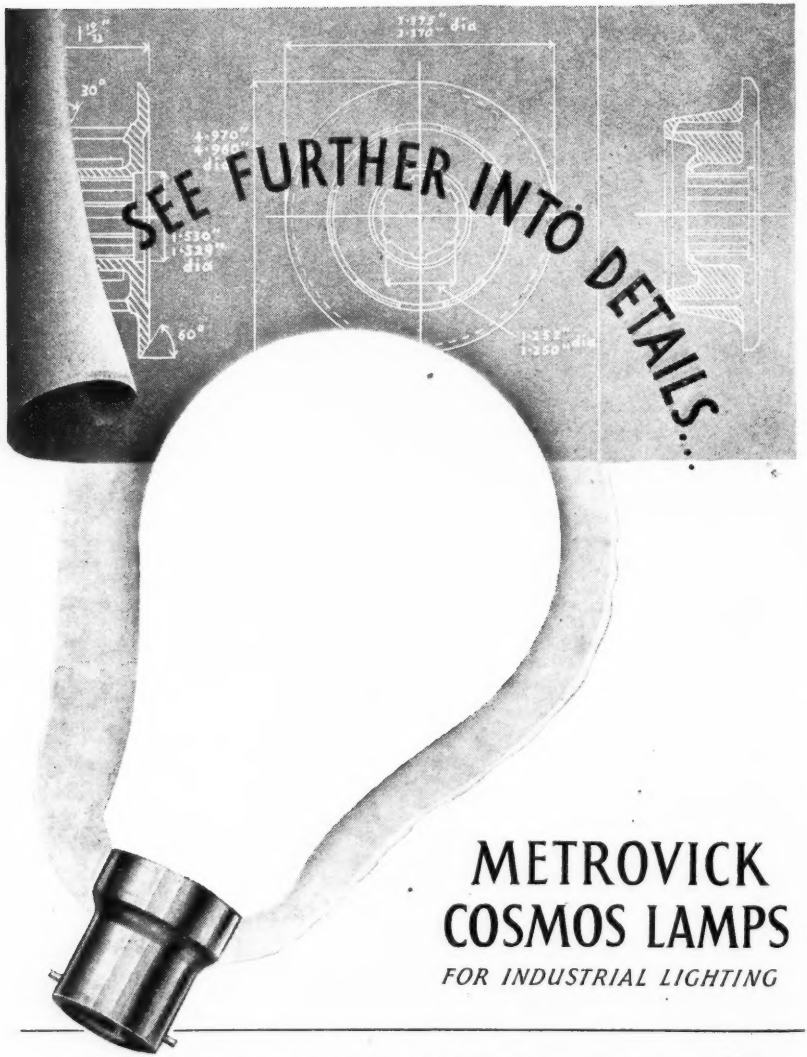

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ELECTRICAL REVIEW

March 22, 1946

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Technical Editor :
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J. H. Cosens

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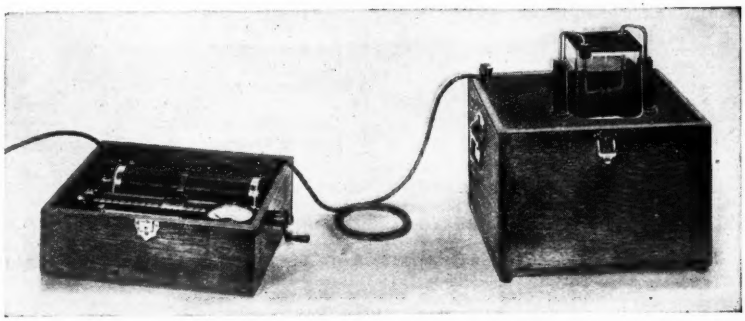

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXVIII. No. 3565. MARCH 22, 1946 9d. WEEKLY

National Ownership

March of the "Big Battalions"

ANY hopes which may have lingered in the breasts of electricity supply authorities that perhaps, after all, nationalization would not be proceeded with just yet were dispelled by the Minister of Fuel and Power in his speech at last week's annual luncheon of the British Electrical Development Association. Mr. Shinwell made it quite clear that the Government intended to act upon the "mandate" given it by the electors last year. It is arguable, of course, that the average elector was not cognizant of the precise nature of the mandate he was bestowing, but that can probably be said of any popular election. It is left to the receivers of the mandate to interpret its terms and produce plans within (or sometimes without) a broad "framework."

Combative Tendencies

Mention was made by the Minister of a recent decision of a section of the electricity supply industry to fight nationalization. The reference, of course, was to last week's statement by the company undertakings who are of the opinion that improvement can be achieved without turning the industry inside out—an opinion also held by a number of municipal concerns. Mr. Shinwell accepted the challenge but promised that he would not proceed with legislation before consulting the industry. He told Sir William Walker that he was ready to discuss the question with him as man to man but gave a glimpse of a knuckle duster beneath his velvet glove when he assured Sir William that he (the Minister) would win in the end because the big battalions were on his side.

Thus it seems that the most that opponents of public ownership can hope for is expropriation on reasonable terms and that is all that they can fight for. Unconditional surrender is not to be expected; indeed we hope that the Government has never harboured this thought. If there must be acceptance of the inevitable, still some effort must be made to ensure that any change is equitably accomplished.

Same Men: New Masters

But "if hopes were dupes fears may be liars." Although nationalization will be unpalatable the electrical industry must still advance and it can do this only by retaining the administrative and technical skill and experience which have brought it to its present pre-eminent position.

Civil service methods cannot be applied to dynamic enterprise without slowing it down. As it is the Government's avowed intention to accelerate progress it follows that more freedom, not restriction, will have to be given to those who now operate electricity supply. How this is to be achieved can only be worked out by consultation and this means that the Minister will have to accept and act on the advice of the industry itself. He has promised to get rid of outmoded legislation which has hampered development; he must be careful that any new legislation does not have the effect of discouraging the enterprise of the individual.

One thing to be guarded against is "integration" with gas. The Govern-

ment will not achieve its aim of electricity for all at a reasonable price if it attempts any sort of allocation of functions. At the moment it does not seem as though that idea is so prominent as it was at one time.

Above all, if nationalization is to come "'twere best done quickly"—or at least the proposals should now be revealed. Electricity supply undertakings are at present operating in an atmosphere of suspense and uncertainty. If the Government has a plan why should it not be published? If a scheme has not yet been worked out how much longer has the industry to wait?

Against Nationalization

The company undertakings are determined to oppose nationalization "by every legitimate means." Nationalization, they say, is entirely opposed to the interests of taxpayers, consumers and employees of the industry. They state that proposals for improving organization have already been placed before the Ministry of Fuel and Power by all sections of the industry and plans have been lodged with the Electricity Commissioners for further extension of distribution, particularly in rural areas. By their proposed expenditure of £100 million the companies claim that within five years they will meet every reasonable demand without the upset inseparable from nationalization.

London Transport

THE story of the operations of the London Transport Board during the six years of war, told in its twelfth annual report, is one of triumph over adversity, a triumph issuing from a well-knit organization arranged well in advance of events. As most undertakings, the Board is faced with great arrears. Its constructional programme calls for an expenditure of £7,400,000 (partly based on pre-war prices), apart from the overtaking of maintenance and renewal arrears. Future developments are dependent in part upon town and country planning. One possibility mentioned is high-speed tubes; another is higher fares.

Water Heating

WHATEVER views one may hold regarding the best methods of ultimately providing hot water in those dwellings, forming a large majority, that are occupied by people with small incomes, it is apparent that for very many years solid-fuel systems (new as well as old), which are combined with an important proportion of the space heating, will have to be taken into account. The question then becomes one of seeing how far the benefits of electrification can be worked in with an existing order of things, in order to secure a share of a vast load and at the same time to make an unrivalled contribution towards labour saving and domestic amenities—a contribution that will become less and less a casual one if installations are properly carried out.

Plumbing

WHILE there may be differences of opinion about the electrical details of water heaters, these are of minor moment compared with the engineering principles involved in layout and plumbing. These are worked out in the paper presented by Messrs. R. Grierson and Forbes Jackson at the I.E.E. last week in a manner that is likely to make it a standard work of reference in compressed form. The large audience included architects and heating engineers, whose collaboration at the earliest stage of installation is essential, and even those with experience in the non-electrical aspects will no doubt find the data presented of practical value, as—to judge from examples commonly found—the principles of thermosyphonic circulation and waste of heat in pipes, which are dealt with by the authors, are not always fully appreciated by those responsible for installations.

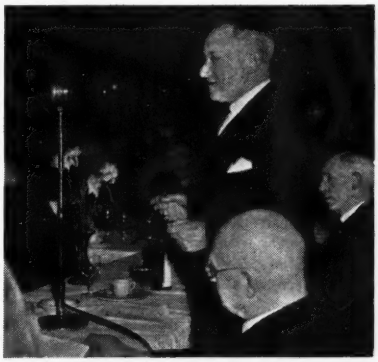
Keeping Up to Date

ONE of the recommendations of the Percy Committee on Technological Education was that teachers in technical schools should be enabled to return to industry for substantial periods in order that they might keep abreast of industrial technique. Wisely the Ministry of Education has decided to act on this recommendation and has introduced a scheme by which these teachers may be granted special leave up to six months, with full pay, with an additional six months without pay, to enable them to take refresher courses in industrial establishments. The announcement of this scheme is coupled with a statement of the need for a greater supply of teachers for technical schools and colleges.

Progress of E.D.A.

Minister of Fuel at Annual Luncheon

AS usual, many distinguished men and women were among the company (about 580) at the annual luncheon of the British Electrical Development Association at the Connaught Rooms, London, last Friday. Alderman Sir William Walker (vice-president) was in the chair in the unavoidable absence of the president (Lord Brabazon) in Canada. The principal guest was the Rt. Hon. E. Shinwell, Minister of Fuel and Power, to whom fell the task of proposing the toast of the Association.



Mr. Shinwell at the microphone, with Alderman Sir William Walker on his left and Mr. F. Newey on his right

MR. SHINWELL expressed the appreciation of his Ministry, the Government and the public of the Association's valuable services during the war. He went on to say that he had been given the work of effecting the greatest possible integration of the fuel and power services of the country. Recently one section of the electricity supply industry had announced its intention to embark upon a fight against nationalization. He wondered whether he should disclose his plans or be content to keep his powder dry for the fight. It was the intention of the Government, he said, in dealing with the supply, distribution and development of electricity to consult every interest concerned before proceeding to legislate.

Referring to the "alleged" inferiority of the coal supplied to power stations, Mr. Shinwell said that the Ministry fully appreciated the difficulties which had beset the industry during the war years and every section deserved the highest credit for overcoming those difficulties. Recently he had detected a slight improvement in the coal situation; the grim prospect of three months ago had been surmounted and he hoped that we would now get through the rest of the winter without any closing of factories. He hoped that he would not leave such a legacy as he had inherited; they would see that stocks of industrial and domestic coal were built up during the summer.

The House of Commons Committee on the Coal Nationalization Bill was nearing the end of its work. He and his colleagues were aware that among the administrators and technicians in the industry many were very public spirited and some of these had been attracted to the National Coal Board. There was similar public spirit in the electricity supply industry and the country need have no fear that this would be lacking under State control. The Government could not be prevented by any section from carrying out its mandate from the election although it was open to any citizen to contest its decisions by any legitimate means. The electricity supply industry must be gathered under the "umbrella" of some form of national ownership and they expected the co-operation of the

Mr. and Mrs. H. J. Randall with Mr. Harold Hobson

whole of the brains and skill of the industry.

It was the aim to make electricity available to everybody, not necessarily to cheapen it—although that would come later. They intended to remove restrictions based on outworn legislation to enable the industry to expand to the utmost limit. It was in that spirit that the Government would embark upon its plans and it would seek the aid of the best men in the industry. In this connection he referred to Sir William Walker, the doyen of municipal electricity supply, as an exemplar of freely-given public service. He said that he and Sir William would not necessarily agree but they would discuss it as man to man—although he was bound to say that he (the Minister) would win in the end for he had the big battalions on his side.

Miss Ellen Wilkinson and Mr. F. Newey

Sir Peirson Frank (Pres. Inst. C.E.) and Lord Lytton

E.D.A. was easing the path of the housewife but much more remained to be done to replace labour in the home. He asked all of them to intensify their efforts in co-operation with the State. There was an insistent demand from industrialists for more and more electricity. The greater the use of electricity the further we would be on the road to recovery.

SIR WILLIAM WALKER, responding to the toast, described Mr. Shinwell as a first-class salesman; the Minister had almost convinced him that the power stations were getting perfect coal. Sir William said that his sympathies were with those who had maintained the supply in the face of wartime difficulties. It was only done by a tremendous expenditure of human energy and the effects were becoming obvious in the industry. Although Government Departments had placed factories in the most out of the way places during the war there had not been a single instance in which electric power had not been available on time. This had justified the construction of the grid; independent unconnected undertakings could never have done it.

Mr. Shinwell had stopped too soon when speaking of projected legislation. The industry was in a state of suspense and anxiety as to its future. He assured the Minister however, that the object of all those engaged in the industry was to make it a model for every other industry. Sir William said that for twenty-six years there had been neither lockout nor strike for it had been the policy that promises made must be implemented. Frankness between the employers and employees had fostered the most harmonious relations.

Mr. E. E. Hoadley and Sir John Dalton

On the technical side our system was as good as any in the world. Recent reports from Germany had shown that the Germans had nothing to teach us. Owing to the

shortage of plant and appliances there were still difficulties to be faced but they would all be overcome. He thanked Mr. Shinwell for his promise that there would be consultation with the industry before legislation was produced and he gave an assurance that the industry would not let the country down.

Annual Meeting

MR. F. NEWEY, chairman of the Council, presided at the subsequent annual meeting and moved the adoption of the accounts. In seconding the motion MR. CLARENCE PARKER pointed out that the time was coming when more funds would be needed; he

Sir Geoffrey Wiskard (Secretary, Ministry of Town and Country Planning) with Sir John Kennedy

referred particularly to the expansion of domestic science education and proposed testing house.

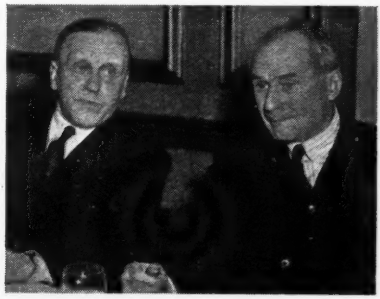
Moving the adoption of the annual report, Mr. Newey referred to the testing house proposal and said it was hoped that the committee dealing with the subject would soon put forward definite proposals.

BRIGADIER GENERAL R. F. LEGGE, who seconded the adoption of the report, mentioned the strengthened relations between headquarters and the Area Committees largely due to the work during the past year.

Sir Donald Ferguson (Secretary, Ministry of Fuel and Power) and Sir Charles Darwin (President, E.R.A.)

MR. E. E. HOADLEY, supporting the motion, stressed the importance of the Association's rural work and referred particularly to the interest now being taken by soft fruit growers in deep freezing.

Dissatisfaction was expressed by MR. E. E. JOLLY at the deficiencies in the water-heating systems of the E.F.M. bungalows which, he



Sir Johnstone Wright and Sir William Douglas (Secretary, Ministry of Health)

said, were a fine advertisement for gas. E.D.A. should have suggested improvements at an earlier stage and it ought now to insist that the Ministry of Works should put the installations right at its own expense. Another speaker said that deliveries of bungalows with the same water-heating system were continuing. E.D.A. should adopt a more aggressive attitude in this matter.

MR. W. N. C. CLINCH (Northmet Power Co.) calculated the annual loss of coal in one of these defective systems, with twenty-six weeks' use as 9 cwt.

Mr. Newey said that since the end of the period under review the Association had made strong representations in this matter. It had not been consulted until the plans were well advanced. Mr. Dale (the general manager and secretary) had been told that improvements had been made and no more could be done. They were insisting that the cost of the alterations should be borne by the Ministry.

Regarding the proposed testing house, MR. J. W. J. TOWNLEY suggested that the Electrical Research Association should be closely consulted as it

had already done much in this matter. There should be no wasteful overlapping between the two bodies and appropriate fees should be charged for testing appliances.

Mr. Newey replied that the Council was fully alive to the need for co-operation with the E.R.A. and had no doubt that fees would be charged.

ALDERMAN DUCKWORTH thought that E.D.A. should provide projectors with its films for the education of electricity committees and municipal authorities. Mr. Newey said that arrangements had been made to provide projectors for the Area Committees' use when they became available. The report was then unanimously approved.

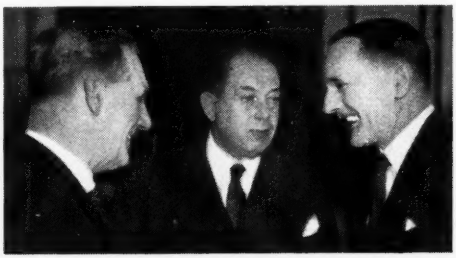
Proposing the re-election of Lord Brabazon as president for a fourth term, Mr. Newey read a letter from Lord Brabazon regretting his inability to be present. Lord Brabazon's re-election was unanimously accepted and the Dowager Lady Swaythling, the Rt. Hon. W. S. Morrison and Mr. C. D. Taite were elected vice-presidents for the period 1946-49.

Sir Cyril Hurcomb, Mr. H. J. Randall (the new Chairman) and Dr. P. Dunsheath

CAPT. J. M. DONALDSON proposed a vote of thanks to Lord Brabazon describing him as the most keen president the Association had ever had, not excepting Dr. Ferranti who was an exceptional man. This was seconded by MR. J. ECCLES, who suggested that a cablegram should be sent to Lord Brabazon. This was agreed to. A vote of thanks to the chairman was proposed by MR. H. J. RANDALL and seconded by ALDERMAN J. W. RAYMENT and Mr. Newey, in replying, thanked Mr. Dale and his staff for their services.

MR. CLINCH, seconded by MR. F. W. LAWTON, moved a vote of thanks to the officers and members of all E.D.A. committees and to the technical press. This concluded the proceedings.

A meeting of the new Council followed the annual meeting. The names of the members of the Council and the appointing organizations are given in our "Personal" section.



Sir Stanley Angwin in cheerful mood

Report for 1945

TEN new members (six municipal and four company undertakings) joined the Association in 1945, raising the total membership to 414. In addition two further Dominion contributors were enrolled.

In the place of the Executive, Accounts, and Campaigns and Publicity Committees the Council has established a General Purposes and Publicity Committee and a Finance Committee. There are also committees on the following special subjects:— Cooking; street lighting; Building Centre; and rural electrification.

During the year the staff of the Press Department was augmented and it is noted that contacts with newspapers and magazines were strengthened. This Department co-operated with the Area Offices in publicity work in connection with the E.D.A. electric kitchens and, with E.A.W. officials, it was responsible for arranging special days at the first Women's Electrical Exhibition in October last.

Two films were completed during the period (one of them in co-operation with the Electrical Association for Women) and two others, for cinema distribution, were begun in collaboration with Sir William Beveridge and Mr. Geoffrey Crowther.

Great public interest was shown in the four all-electric kitchens arranged at the Building Centre and assistance was given to other bodies in the organization of exhibitions, national and local. The Association's display at the London Building Centre has been maintained and it is hoped soon to have an exhibit at the Glasgow Building Centre.

As regards housing, advice and assistance were given to numerous housing authorities, architects and builders concerning electrical facilities and the design of kitchens. Frequent discussions took place with the Directorate of Temporary Housing and other departments of the Ministry of Works and members received bulletins describing new systems of wiring and special types of appliances installed. A booklet on "Electric Service in Temporary Houses" was produced for the use of tenants. A panel of consultant architects was appointed to investigate and report on the use of electricity in post-war schools.

The Electric Cooking Committee and its Technical Sub-Committee dealt with a number of problems in connection with domestic appliances and the specification for the interchangeability of cooker replacement parts was completed. A start towards universal interchangeability was made by the adoption of the E.D.A. specification for the special "V" cooker for temporary houses.

A technical committee produced during the year a purchasing specification for a compact consumers' service unit. This, while allowing manufacturers freedom in the design of components, will ensure uniform overall size and interchangeability of fixing.

A new Rural Electrification Advisory Committee representing consumers as well as the electrical industry was set up, with three sub-committees—policy, publicity and exhibitions, and technical. Good progress was made in preparatory work intended to encourage the extension of mains in rural areas, the greater use of electricity on farms, and adequate demonstrations at agricultural shows and exhibitions.

A report was submitted by the special committee appointed to consider the establishment and operation of an electrical domestic appliance testing house which would furnish factual reports to members. The Area Committees considered that the scheme should include a distinctive mark for approved appliances and after obtaining legal opinion on the matter the Association opened negotiations with the Trade Marks Department of the Board of Trade.

Among other subjects referred to in the report are the provision of technical advice and information; pre-vocational training for the Services; British Standards and Codes of Practice; the Housebuilding Industries' Standing Committee; electrical industry scholarships (Caroline Haslett Trust); the London School of Electrical Domestic Science (which re-opened in January); the salesmanship training course (which has been revised and is hoped to begin again soon); lectures and demonstrations; and the Joint E.D.A. Manufacturers' Committee. Reference is also made to the work of the Area Committees, the Electric Vehicle Association and the Electrical Association for Women.

Subscriptions for the year were at the full rate (against 70 per cent for 1944) and as a result the income rose from £95,367 to £139,398. Expenditure increased from £95,056 to £141,087, leaving a debit balance of £1,689, against a surplus of £311 for the preceding year.

Above: Mr. S. S. Grant, Lord Horder and Mr. C. Parker

Left: Mr. J. W. Beauchamp, Sir Johnstone Wright, Mr. Harold Hobson and Mr. A. C. Cramb

Design in Industry

Draughtsmen-designers in the light metal industry will be among the first to benefit from a series of courses which is being organized by the Council of Industrial Design. These will be short refresher courses for young designers who, on account of the war, have missed some of their training and have had very little opportunity to study general trends of design. This first course (for about thirty) will be held at Pendley Adult Education Centre from April 8th to 12th. The cost of the course is £2 per person, which includes board, lodging and tuition fees. Employers who would like to send their designers to these courses should apply to The Director, Council of Industrial Design, Petty France, S.W.1.

Views on the News

Reflections on Current Topics

THE most appreciated speech at the E.D.A. annual meeting last week was, I think, that of Mr. H. J. Randall, who is the new chairman of the E.D.A. Council. Mr. Randall has a pretty turn of wit and provided the lighter touch which is so necessary for the leavening of a routine business meeting. But it was another speaker who referred to the chairmen of committees as " Cinderellas working in the vineyard " thus conjuring up a delightful picture of rural domesticity.

* * *

It is good to see that supplies of household appliances for the home market are well on the up-grade. Indeed the rate of production in one or two cases is greater than it was in 1935, the year used for comparative purposes in the " Monthly Digest of Statistics." Electric fires, for instance, were produced at the monthly rate of 115,000 in the last quarter of 1945; in somewhat the same period of 1935 the rate was 100,000. Irons showed an even greater advance, from 100,000 a month in 1935 to 155,000 a month in the last quarter of last year. Vacuum cleaners were being made at about half the 1935 rate and kettles at about two thirds. There is no mention of cookers in the Digest and refrigerators are another missing item.

* * *

With the completion of their contracts for " V " apparatus for the Ministry of Works temporary houses in sight, electric cooker manufacturers are now faced with the production of units for permanent houses to be built under the " National Housing Drive." I understand that the Government has issued " blanket " orders for 150,000 " N.H.D." cookers for delivery before the end of next January, and after the " V " cookers, will have priority over other orders. All cooker manufacturers are affected by the scheme, which calls for the makers' standard type of small cooker as approved by the Ministry of Supply, which will fix the price after cost investigation. There is no question of the production of the " V " cooker being continued, which is in some ways a pity since it is a first-class job ; the unit has been produced to meet a special urgent requirement, and all the leading cooker manufacturers have pooled their patents and skill to achieve the desired result.

* * *

The uncertainty as to the actual deliveries of the " N.H.D." cookers required (the orders will come from the local housing authorities) makes the future production of non-priority cookers somewhat of a problem, especially in view of the shortage of such materials as ceramics, nichrome wire, switches and castings. Though I have no figure regarding the total cooker production of the manufacturers, I gather that considerable capacity should remain after the " N.H.D." requirements have been met and of course production is likely to expand substantially as time goes on. The " N.H.D." programme also calls for large quantities of wash boilers, though I am told that the numbers to be earmarked are very much less than the number of cookers—probably something less than half.

* * *

Apart from the numerous solid fuel and gas appliances doing their best to look and operate like their electrical counterparts, probably the most striking feature of the " Good Heating for Every Home " exhibition which the Solid Smokeless Fuels Federation is now holding at the Horticultural Hall, Westminster, is the greatly increased use of electrical apparatus for securing automatic control. No longer are electrically-operated automatic stoking, draught and temperature control, etc., reserved for industrial and commercial heating, cooking and water heating installations, but central heating and hot water supply systems in quite small domestic premises are now being equipped with electrically-operated valves and other devices for the purpose of securing a constant and trouble-free service.

* * *

New methods of house construction are of interest from the electrical installation point of view, and my readers may therefore like to hear of a novel principle which is being tried in South Africa for prefabricated bungalows. A 12-inch steel pipe embedded centrally carries the roof in the form of an umbrella, and the walls, thus relieved of all the loads, can be much lighter and do not require heavy foundations. The steel pipe serves as a chimney, but in an all-electric house would no doubt be useful as a duct for ventilation or for services. In a new method of supporting the ceiling which is being experimented with asbestos sheets are placed on space blocks suspended from the roof members. Houses are to be built in 434 sq. ft. " umbrella " units, and a two-unit house with three bedrooms, lounge, dining-room, bathroom, entrance hall, kitchen and pantry is expected to sell for £800 and take 18 days to complete.

—REFLECTOR

Main-Line Electrification

A Nationally Important Subject

By "Cincinnatus"

IT is some fifteen years since the Committee on Main-Line Electrification produced its report, known subsequently as the "Weir Report," which set out a number of unanimous conclusions. Since then progress in railway electrification in Great Britain—apart from the notable enterprise of the Southern Railway—has been slow, although the many advantages and economies of conversion from steam operation have long been recognized and steam-locomotive practice is nearing its limit of advance. Improvements in fuel economy of these locomotives appear to be accompanied by higher capital costs and maintenance charges, but steam-tradition engineers are probably reluctant to give way to the electrical method, as long as there are possibilities of improvements in design.

Companies' Intentions

Recent issues of the *Railway Gazette*, however, have joint advertisements of the railway group which state: "The road forward from war to peace, with the reallocation of industry and the many adjustments of national life, will bring new problems. Electric traction, tested and proved invaluable in peace and war, in the densely populated areas of London, South of England, Manchester, Merseyside and Tyneside, will help to solve these transport difficulties." This is a sign that electrification plans are being considered; indeed in 1944 statements were made that electrification of railways would be an important part of post-war schemes.

The Weir Report pointed out that the railways should take advantage of new methods of reducing the cost of railway transport and emphasized that suburban electrification on a large scale had shown economic gains and operating improvements, leading to valuable increases in revenue through improved service. The increased traffic on suburban lines through electrification enables overhead costs to be distributed over a greater number of train miles, but the Weir Committee stated that, despite differences, the results of suburban electrification presented important considerations in favour of electric haulage for main lines. The Committee commented on the improved electricity generation and transmission conditions resulting from the construction of the grid system with its favourable price structure and its large and interconnected generating resources, and referred to the usefulness of the additional transmission system needed for railway electrification in the future development of rural electrification. It suggested that the railways ought to be in a position to get their supplies for traction direct from the Central Electricity Board, a proposal which came into effect four years later in the Electricity (Supply) Act of 1935.

The Report decided that the greatest benefit would be obtained from a comprehensive scheme, covering all unelectrified lines and developed as a "combined operation" by the railway undertakings to get the maximum economies of design and construction. The advantages of electric operation were summarized thus: "The adoption of electric traction would afford to the railway companies the opportunity of intensifying their main-line and inter-urban services on more economic terms than are open to them under conditions of steam traction." It was pointed out that important financial economies would result from conversion to electric operation and that with them would come advantages of comfort and improved service, increased capacity and cleanliness of transport.

Possible Savings

The financial statements of the Weir Report were equally convincing. The estimates of comparative cost were made in 1930 and since that date the course of costs and prices has been more and more favourable to electrification. The capital cost of electrification was estimated as approximately £260 million, on which a return of nearly 7 per cent was forecast. Electrical operation was estimated to show an annual saving of some £17 million (net) over steam operation, apart from certain indirect savings. Among the gross savings, locomotive wages was the principal item at £10 million; repairs of tractors came second at £6 million and locomotive fuel was third at £1 million. Of the total estimated capital expenditure,

covering the electrification of all standard-gauge steam-operated railways in Great Britain, more than 80 per cent consisted of two items, viz., electric tractors and track equipment.

The Weir Report considered a complete scheme of electrification to be carried out over a period of about twenty years. The trends of costs, wages and price levels since 1931 are known, but estimates of probable costs made now would have to consider the likely conditions during the next twenty years. The trend of design, coupled with price trends, indicates increases of the order of from 30 to 40 per cent above pre-war figures for electric locomotives, but only the roughest approximations are possible, since such factors as advances in manufacturing efficiency and simplification and standardization of design have to be brought into calculations of future costs.

An overall increase in capital costs of 40 per cent might be taken as a rough guide, but it is too early to estimate with any accuracy the probable trend of such important items as world copper prices or the price of steel. On operating costs, the chief item, locomotive wages, has risen appreciably and might well average 40 per cent above pre-war levels. Repairs to tractors, being to a great extent a labour cost, would show a similar increase, while coal costs may be assumed to be at least twice the 1931 estimate of 17s 6d per ton. The overall effect of changes of this magnitude would be to alter the rate of return on capital very little from the original Weir estimate of 7 per cent, but the operating economies, above all coal economy, would be more significant.

Coal Economy

The Weir Report estimated the total coal consumption by steam locomotives as 13·5 million tons (1929) or some 5 per cent of the total coal tonnage raised, which was nearly 260 million tons in 1929. Through conversion to electric operation, a saving of nearly 10 million tons of coal was forecast. For to-day's conditions, savings in coal would be slightly higher, but they would represent a greater proportion of the total coal output of the country, since it has dropped to 185 million tons a year. In the present difficult state of the coal industry, a saving of this magnitude is important. Electrical energy costs per kWh would be somewhat up on the 0·45d or 0·5d originally estimated, but the coal increases would be of such an order that very large energy-operation economies would result from electrification.

It is evident that the case for main-line electrification, from the financial or economic angle alone, is even stronger than it was fifteen years ago. On the grounds of coal conservation, modern conditions make it still more favourable. From the viewpoint of advances in practice, the case is further improved, for the technical progress of electrical methods is more rapid (as in the design of electrical equipment for motor coaches and driving trailer coaches) than that of steam operation, which approaches its limits.

The Weir Committee made certain basic assumptions about operating conditions, i.e., an average traffic density of 3 million trailing ton-miles per running-track mile per annum for the whole railway system and a total ton-mileage of 114 million. These figures may be low for post-war conditions; moreover, increased traffic density means reduced cost of electric operation per ton-mile, as the fixed charges per track mile are distributed over a greater number of trains.

Cleanliness and Comfort

Another factor is that the coal used for generating electrical energy would not need to be of such high grade as that required for running steam locomotives and a more efficient spread of demand for the various grades of coal should result. Another important point is the effect of the fuel used on the maintenance costs of railway stations, especially terminal stations, and other buildings. One can visualize the difference between their present dirty and gloomy appearance and their appearance in the future when no steam trains are allowed within, say, twenty miles of a main city.

In addition there would be improved heating and air conditioning of trains. The big increases in the price of coal have made electrical energy far more competitive for heating purposes than before. Railway stations could be made comfortable and attractive if they had plentiful supplies of electrically heated hot water, and electrically fitted restaurants and refreshment rooms. Even the sombre waiting-room could be transformed by modern electric lighting and the use of radiant heating devices.

Apart from such considerations, there is the need for Great Britain to keep abreast of other countries in modernizing railway transport. Reliable and up-to-date figures

for other countries are not available at present, but estimates of 1938 showed that Italy, Sweden, Switzerland, France and Germany all had well over 2,000 route miles electrified, Italy leading with 7,000 miles, followed by Sweden with 2,700 miles. The United States and the U.S.S.R. showed 3,100 and 6,900 miles. The figure for Great Britain was 1,180 miles.

Last spring it was announced that the electrification of the Swedish State Railways had saved 7 million metric tons of coal during the war. In January of this year, it was stated that the conversion of the Paulista Railway of Brazil from steam to electric working had reduced the average working costs per train mile from 70 cents to 23 cents. The U.S.S.R. railway system was extensively damaged by the German invasion and a fifteen-year plan of electrification is to be undertaken to cover 12,000 miles—3,600 miles carrying the highest freight tonnage to be completed within the first five years. Further, it is proposed to electrify completely the railway systems of ten important cities, including Moscow, Leningrad, Stalingrad, Minsk and Kharkov.

There are at least two large-scale examples of successful electrification in this country—the Southern Railway's suburban scheme, probably the largest in the world (apart from its main-line extensions), and the London Passenger Transport Board's Greater London network. While railway traffic conditions vary throughout the country, the success of the Southern developments has demonstrated the practical value of electrification of British railways. It is time that the nationally important subject of railway electrification was re-examined by an authoritative body as part of urgent problems of transport modernization.

Such a study should deal, to some extent, with the intensification of suburban electrification, which was estimated in the Weir Report to require additional capital expenditure of about £45 million, on which a return of 13 per cent could be expected.

American Power Industry

Slight Recession in 1945

SOME details of the United States electricity supply industry in 1945 are published by the *Edison Electric Institute Bulletin*. From these it appears that the total sales to ultimate consumers amounted to 194,000 million kWh (November and December figures estimated), as compared with 198,161 kWh in the preceding year, representing a decline of 2·1 per cent. The decrease was mainly due to a 5·8 per cent fall in the consumption of large-scale industry which was responsible for more than half of the consumption (108,450 million kWh). The next class in importance, residential or domestic consumers, actually increased its demand by 9·1 per cent, to 34,100 million kWh, while rural consumers were responsible for an increase of 8·2 per cent, to 3,650 million kWh.

The total revenue, amounting to $3,334 million was up by 1·7 per cent, due principally to a rise of 6·3 per cent in the case of residential consumers. It is estimated that the consumption of the average residence in 1945 was 1,225 kWh, in spite of the shortage of electrical appliances.

The number of customers rose during the year by about 800,000 to a total of 33,900,000, the increase being particularly noticeable in the case of rural areas. About 270,000 farms were connected up during 1945, raising the total to slightly over 3,000,000, over half of the country's 5,950,000 farms. It is expected that a further 600,000 will be added in the next three years. It is noted that in opposition to the general trend of prices the cost of electricity actually fell during the war period. The average cost of domestic electricity has decreased by 14 per cent since 1939.

Generating plant to the extent of 750,000 kW was added in 1945, raising the total capacity to just over 50 million kW; the maximum load is estimated to have been 41 million kW, leaving the comfortable margin of 22 per cent. The output in 1945 was about 221,500 million kWh of which 140,250 million kWh was produced by steam plants and 79,450 million kWh by water-power plant. Steam-generated power declined by 8·0 per cent and hydro power rose by 7·4 per cent.

Fatality

WHILE helping to erect an aerial at the fish docks at Grimsby James Heath (22), rigger, received a fatal electric shock. It was stated at the inquest that the aerial was being erected on the roof of premises belonging to the Crampin Steam Fishing Co., and it was necessary to pass the wire over an insulated electric lighting cable belonging to the L.N.E.R. After the accident it was found that there was an abrasion in the insulation of the cable about ¼in. in width. Mr. F. Crampin said a test showed that about two miles of wire would need to be pulled over the cable to damage it, but Mr. E. P. Jacobs, an inspector in the Mechanical Engineer's Department of the L.N.E.R., contended that the dragging of the aerial wire over the cable caused the exposure of the conductor ; he had made a test and produced an identical abrasion.

Welding Loads

Views of Electricity Supply Engineers

THE paper by MR. A. LANGLEY MORRIS on "Three-Phase Distribution and Electric Furnace and Welding Loads" (*Electrical Review*, March 15th, p. 416) was read and discussed at a meeting of the Transmission Section of the I.E.E. on March 13th. The first speaker, MR. R. B. GILES (Air Ministry), said that there was at present a complete divergence of opinion about the characteristics of welding and other single-phase loads; some authorities would accept those loads as they did all others but at least one large undertaking refused to accept them. He asked under what statutory right that action was taken. They were different from other loads and required special treatment. The power factor of spot welders, which were by far the most numerous type in use, was generally below 0·5 and could be as low as 0·2 largely due to the inductive effect of the large throat area. A welder having a minimum power factor of 0·29 and a minimum kVA of 872 (name plate rating 650) had recently been combined with a series condenser, resulting in a final power factor of 0·705 and a maximum kVA of 350. The phenomenon of series resonance, on which this scheme was based, had been extensively and successfully applied in America and was now coming into use in this country where it had already reduced voltage fluctuation from 5 to under 1 per cent.

Rotating Machines Undesirable

The low power factor and large variation in demand made the spot machine unsuitable for 3 : 1 phase-balance equipment of the kind described in the paper. Apart from initial cost, the use of motor generator sets for arc welding in rural areas was more satisfactory than transformer operated plant, but generally speaking the use of rotating machines was neither necessary nor desirable and must place an unnecessary brake on progress. What was required was a transformer set with greatly improved characteristics. The consumer should either pay any special capital charges, or an agreed annual charge.

MR. A. E. VILLIERS (Quasi-Arc Co.) said that supply authorities were apt to confuse transformer arc welding sets with resistance welding equipment and tried to frame regulations to cover both types. As regarded the author's statement that it required 80 to 100 V to initiate the arc, he suggested that very much lower values could be used with consequent lower kVA demand and better power factor. The nature of the flux covering the electrodes had quite as much influence as voltage on the ease of striking of the arc.

MR. J. B. HANSELL (Metrovick) said there was no advantage in the 3: 1 transformer from the single-phase point of view. It might be justified occasionally when it was desired to have the single-phase load between lines and when another single-phase load was to be connected to the system. He was not quite sure that the simplified effect of the 3 : 1 balanced conversion mentioned in the paper was quite as good as it seemed. The "on period" and "off period" currents (as tabulated) were not in the same phase.

Voltage Variation No Criterion

MR. D. P. SAYERS (Birmingham Electric Supply Department) said that a simple statement of the arithmetical value of the voltage variation did not indicate whether a particular welder would or would not constitute a nuisance to other consumers. In certain circumstances a voltage pulsation of less than 1 per cent in value could be more objectionable than a greater variation in other circumstances.

MR. T. H. CARR (Bradford Electricity Department) questioned the need for special tariffs. Certainly ordinary welders did not justify them, although they might be necessary in shipyards where there were very big loads. In Bradford they gave consumers the choice of the heating rate or the power rate; and it was necessary only to impose a slight restriction on use and there had been few, if any, complaints about flicker.

MR. A. HADDOCK (Sheffield Electricity Department) could not perceive a single desirable characteristic in single-phase welding loads. The problem was not mainly technical, but an economic one. There was need for a comprehensive examination of the costs of supplying welding loads with and without phase conversion.

MR. F. S. NAYLOR (Islington) said the

author had described an important invention, but one must be satisfied that it would accomplish what was so definitely needed and be sure about the economy of installing the new device so that it could be related to the tariff question.

MR. K. H. GILLANDERS (Quasi-Arc Co.) expressed satisfaction that the author had referred to the optimum size of condenser which should be connected to a single-phase arc welding transformer set to correct the power factor. In practically all cases he had had to deal with, the effect on the supply line had been negligible provided a suitable condenser was installed and the set was installed across lines and not between phase and neutral. It was much better, in most cases, to connect a smaller condenser than that arrived at by the author's rule.

MR. H. E. KNIGHT said the rating of flash butt welding transformers was often very loosely arrived at and it was a pity some lead had not been given by the Author on this difficult subject.

DR. H. G. TAYLOR (Philips Group) expressed surprise that supply engineers had not held up their hands in horror at the thought of a leading power factor. Would they indicate clearly whether or not they approved of a leading power factor?

THE AUTHOR, in reply, said the discussion had borne out the conclusion he had arrived at when he first attempted to write the paper, which was that he was faced with a bewildering number of factors. A great deal of research and investigation would be necessary to answer the points raised. The answers could only be obtained from specific cases; there could be no general statement covering all conditions.

Hot-Water Installations

Suggested Improvements

AT a meeting of the Installations Section of the Institution of Electrical Engineers on March 14th, MESSRS. R. GRIERSON and FORBES JACKSON read their paper on "Engineering Principles Applied to the Design and Construction of Domestic Water-heating Machines of the Solid Fuel-Electric Type," which was summarized in our last issue. The discussion was opened by MR. R. H. RAWLL (Birmingham Electric Supply Department) who said that the scarcity of fuel would probably mean a very much greater demand for auxiliary water heating. The industry must not forget the existing installations; the number of houses not equipped with electric water heating was still enormous. He thought that the authors had concentrated too much on thermostatic control; 50 kWh per week meant something like 3s. a week and therefore there was a field for hand control. Although some thought that this adversely affected the peak he did not think there was much in it.

MR. G. G. BAINES (R.I.B.A.) welcomed the idea of collaboration and said that architects had a lot to learn about water heating. Some manufacturers produced immersion heaters which were too long for the cylinders installed and he suggested that a cylinder and heater, in one unit, should be marketed.

MR. J. I. BERNARD (E.D.A.) said that there was no reference to circulators; the authors seemed to confuse the fixed immersion heater with the circulator. A very large number of circulators were in use, for in certain circumstances this was the quickest way of getting hot water in the morning. Where constant hot water was required, the equipment described by the authors was the ideal arrangement. He thought the effect on the heavy morning peak was likely to be less with the thermostatically controlled storage system than with the hand controlled circulator. Complaints of the high cost of electric water heating were always due to immersion heaters used in incorrectly designed installations.

MR. H. H. BRUCE (Institution of Heating & Ventilating Engineers) referred to the temperature of the heating surface and the precipitation of scale, and said that no doubt these points had been taken into account in drafting the specification mentioned. From experiments on the relative positions of the immersion heater and the thermostat a number of interesting points had emerged. A non-adjustable thermostat might be fitted, pre-set to the minimum temperature, below the immersion heater, and the maximum temperature could be limited by the proper positioning of convective circulating plates so that a lower temperature could be maintained in the vessel during the night, say 120 deg.; the temperature could be progress-

ively increased to 150 deg. during the daytime.

MR. G. W. PRESTON (Copper Development Association) said there was no justification for the statement in the paper that copper pipes must not be used with hard waters. Cupro-solvency in hard waters was often much less than in soft waters.

MR. C. J. VENESS (Electrical Contractors' Association) said that when a first-class installation was put in the householder rinsed plates under a running tap and did other things which resulted in all the heat savings going down the drain. Would it be possible in the case of new houses to segregate the electric system from the solid fuel system? It only meant about three extra taps and they could be marked "electric" so that the user would know he was letting heat run to waste. No mention had been made of the thermal storage tanks which were on the market.

E.R.A. Experiment

MR. P. SCHILLER (E.R.A.) said the relative advantages of thermostatic and hand control could be decided only by practical experiments. The Electrical Research Association proposed to experiment on a large housing estate. The houses would be segregated into groups of about 100, each group being equipped with a different combination of appliances. Measurements would then be taken which would make an intelligent comparison possible.

MR. TYRRELL (Non-Ferrous Metals Research Association) said that in soft acid waters there was a slight general attack on copper but none in hard waters. That did not appreciably reduce the life of the installation. In the case of mixed plumbing, however, the small amount of copper in the water sometimes caused local corrosion. The failure of tin-copper immersion heaters did not seem to be due to normal corrosion, but to the very high temperature which the copper reached.

MR. T. H. CARR (Bradford Electricity Department) thought the rateable value tariff was useful in connection with water heating because by offering a larger block of cheap units, water heating would be encouraged during the summer. As to heat insulation, he had lagged cylinders with corrugated cardboard overlaid by leatherette which was given a coat of aluminium paint.

MR. R. JESSELL (Ministry of Works) explained that in certain houses 21-in. doors were specified so that with the 18-in. diameter cylinder it was impossible to have 3 in. of heat insulation. There did not seem much point in storing heat just for storage sake, except that electrical energy was used at night when it was plentiful. He described a method by which an external circulator heated the water in the cylinder from the top downwards so that with an additional thermostat it was possible to limit the amount of water heated and stored. This system, said the speaker, was economical in energy consumption.

MR. A. E. MORGAN (Leyton Electricity Department) spoke of the use of 12-gallon storage heaters, as against the 20 mentioned in the paper; a number of undertakings were hiring out such heaters to small families and he mentioned a family of five which obtained its hot water for 4s. 4d. per week. He maintained that at present day costs electricity could compete with solid fuel for water heating and expressed regret that the authors had not given the details of the comparative efficiencies of gas-fired boilers. Mr. Forbes Jackson had mentioned 50 per cent, but he thought it was more like 40 per cent, and the comparative costs were 1s. per therm for gas and 1d. kWh for electricity. He also expressed regret that no reference had been made to the under-the-sink heater.

MR. G. O. MCLEAN thought the authors' illustration of the hour-to-hour demand for hot water, should have been based on an investigation of hundreds of households instead of one case only. Even then the results would only have been indicative of the locality of the premises and the tariff charged. He also advocated the use of the under-the-sink type of heater.

MR. A. C. HAZEL (Low Temperature Carbonisation, Ltd.) said that the figures in the paper showing electricity in a favourable light were too optimistic. With a family of five with children being bathed every evening, the consumption would be more than 150 gallons per week.

The authors are to reply to the discussion in the *Journal*.

Supplying Cumberland Farms

Addressing the Wigton branch of the National Farmers' Union, Mr. Gamlin of the Mid-Cumberland Electricity Co., Ltd., said that his company had supplied electricity to about 650 farms since 1932. It had prepared a five years' programme but this could not be put into operation yet owing to scarcity of materials. Speaking of the uses to which electricity could be put, Mr. Gamlin said he did not think that at the moment electricity could be used as economically as coal for heating.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions

Installation Work at Stoke

"REFLECTOR" draws our notice to the decision of the Stoke-on-Trent Corporation to set up an installation department. This would have been impossible if electrical contractors had shown sufficient enthusiasm in their own affairs years ago. It would also appear that some members of the Council seemed to suggest that all contractors in the area were inefficient people, preying upon innocent electricity consumers—verily an impertinent suggestion calling for immediate action by the E.C.A.

It would be interesting to learn who is going to examine the work carried out by this Corporation and if it is its intention to obey implicitly all the rules and regulations for the electrical equipment of buildings. Some supply authorities have been the cause of a great deal of shoddy electrical installations in the past and until all reputable electrical contractors realize that their job is a profession and take proper steps to protect it, such happenings as mentioned will be the rule rather than the exception.

Glasgow. ALEX MILNE, SENR.

Domestic Electrical Installations

IN view of the enormous quantities of electrical material and accessories which will be required when the housing drive gets into its stride, surely it is high time the Government Department responsible for housing got out a standard system for electrical installations in small types of houses. At present with the housing drive in its infancy the material position seems to be acute when delivery of items such as tumbler switches, switchplugs, etc., is in the region of 12-20 weeks. What will the position be when the houses are being erected in large numbers?

With regard to actual installations it seems that each authority wants different systems to suit its own pet ideas. During the past weeks I have handled inquiries from various sources for installations for houses using the following systems: T.r.s., lead-covered, v.i.r. cables in close joint conduit, v.i.r. cables in light gauge conduit, v.i.r. cables in heavy gauge conduit, and v.i.r. cable in solid-drawn conduit. Each inquiry also varied as to the type of fittings and accessories required. Surely this kind of thing can be avoided.

Much time and money was spent recently in drawing up recommendations for post-war installations and yet nothing appears to have developed. If a standard system for the whole of the country could be adopted, a manufacturing programme could be arranged to meet the demand. It would appear that the most satisfactory system, having due regard to reliability and economy in materials available, would be v.i.r. cables in light gauge conduit with lug-grip accessories. Standard types of lampholders, roses and switches should be used, and specialities kept to a minimum. With regard to switchplugs these should be in accordance with Regulation 201, Clause C, Paragraph IV of the 1946 Supplement to the 11th Edition of the I.E.E. Regulations.

Caterham. A. E. BUCKMAN.

Appliances in Temporary Houses

A CIRCULAR has been issued to housing authorities by the Ministry of Health dealing with the maintenance of electrical appliances supplied by the Ministry of Works with temporary houses. Immediately before the houses are handed over the Council should satisfy itself that the apparatus installed is in satisfactory working order. After the handing over the Council will be responsible for all maintenance and it is recommended that arrangements should be made for such work to be carried out by the local electricity undertaking. The Ministry will transfer the manufacturers' usual guarantee to the Council and the Council or the electricity undertaking will deal directly with the makers for the supply of the components required for maintenance. In view of the difficult supply position stocks of maintenance spares should be restricted to the minimum, at least for some months. To assist in attaining low maintenance costs, a booklet on the appliances has been prepared by the British Electrical Development Association. Supplies of this booklet for tenants have been arranged for through local electricity authorities. E.D.A. has also arranged with manufacturers for supplies of spares to be available to local electricity supply undertakings at rates commensurate with similar parts for standard trade pattern appliances.

Non-Ohmic Resistors

SILICON carbide non-ohmic resistors, which pass a current proportional to the fourth power of the applied voltage, are the subject of a paper submitted by Messrs. F. ASHWORTH, W. NEEDHAM and R. W. SILLARS (Metropolitan-Vickers Electrical Co., Ltd.) to the Institution of Electrical Engineers.

The material dealt with has been marketed under such trade names as "Thyrite," "Metrosil," "Atmite" and "Ocelit": other varieties like "Silit," "Givrite" and "Globar" which do not deviate so markedly from Ohm's law are of a different class and are not dealt with in this paper.

The authors first discuss the behaviour of resistances of this kind, then describe their manufacture and electrical properties, including typical examples of their uses as lightning arrestors and surge divertors for the protection of overhead power lines, in d.c. inductive and radio circuits, for spark quenching at relay contacts, for voltage regulation, for controlling the fields of electrical machines and other purposes.

The limitations which the properties of the material impose upon its usefulness are indicated as are also the factors that determine the amount of power such a resistor can safely deal with, which depends on the characteristics of the circuit in which it is used as well as on the means by which it is cooled.

A bibliography of 24 references to the subject is included and an appendix is devoted to methods of calculating the currents and voltages in circuits containing non-ohmic components of this kind.

Underwater Photography

RESEARCH into the nature of submarine explosions, sea mine and torpedo, has been facilitated by high-speed photography under water when other methods would have been costly and tedious, or impossible. An account of the principles involved, the equipment employed and electrical aids utilized has been issued officially on behalf of the Naval Construction Research Establishment of the (British) Naval Scientific Service.

The account deals only with the flash method, the photographic film being exposed continuously and illuminated with intense flashes of short duration, equivalent to an exposure time of less than five microseconds, enabling good pictures to be obtained singly or at speeds up to 1,500 per second.

Illumination of the necessary intensity is produced by the discharge of a high voltage condenser through a gaseous tube and a thyratron triggering circuit is employed for synchronizing the flash with the event. The multi-flashing procedure is basically similar in principle, the triggering circuit being operated by signals passed from a commutator forming an integral part of the sprocket-wheel of the moving-film camera.

Reference is also made to photo-elastic estimation of explosion stresses with the aid of polarized light as well as to photography by reflected light.

Aerodrome Lighting

AT the March meeting of the Association of Supervising Electrical Engineers, MR. G. A. T. BURDETT gave a lecture on "Aerodrome Lighting and its Control."

The lecturer's object was briefly to indicate the development of different kinds of light sources and their fittings, describing in general terms the purpose for which each is used. He made no claim to cover the whole field of aerodrome illumination, which is a large one; neither did he deal with the technicalities of light production, or installation wiring. The endeavour was to furnish a background to a very important subject which the lecturer considered to be in "such a state of flux" that procedure regarded as normal at the end of the war might soon become of little more than historic value.

It was strongly emphasized that the first essential of an aerodrome lighting system must be that it should afford "absolute" safety to aircraft, crew and passengers. Therefore, if artificial light was used, it should be good.

I.E.E. Southern Centre

IT is now nearly seventeen years since the Hampshire Sub-Centre of the Institution of Electrical Engineers was inaugurated by the then President, Lord Mount Edgcumbe. Last month it was accorded the status of Centre and the "promotion" was celebrated by a conversazione and dance at Southsea on March 12th, at which about 200 members and friends were present.

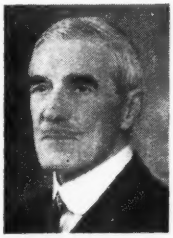
The Centre chairman, Mr. E. H. Miller, referred to the efforts made on behalf of the Sub-Centre by Mr. A. G. Hiscock, first as hon. secretary, later as chairman and now as social secretary, and presented a bouquet to Mrs. Hiscock. Bouquets were also presented during the evening to Mrs. Dunsheath, Mrs. Brasher and Mrs. Miller.

After Mr. Hiscock's reply, the chairman thanked the President of the Institution, Dr. P. Dunsheath, and the secretary, Mr. W. K. Brasher, for coming to Southsea to launch the new Centre. Dr. Dunsheath referred to his recent visit to Canada and the United States, representing the three senior engineering institutions, and to the increasing membership of the Institution (see *Electrical Review*, March 8th, p. 371). The secretary mentioned the extended area covered by the new Centre, of which particulars were given in our issue of March 1st (page 328).

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE North-Eastern Electric Supply Co. announces that **Mr. R. P. Sloan,** chairman for twenty-five years, is to retire this month; his services will be retained in an advisory capacity. Mr. Sloan served his apprenticeship in engineering and later gained further technical experience at Siemens Brothers' Woolwich Works. In 1900 he joined Merz & McLellan, Newcastle-on-Tyne, and three years afterwards he was appointed manager of the Newcastle-on-Tyne Electric Supply Co., Ltd. (now the North-Eastern Electric Supply Co., Ltd.). He was appointed a director of the company in 1915 and became chairman and managing director in 1921, retiring from that position twelve years ago. Mr. Sloan is a member of the Central Electricity Board, and, in the past, has held directorships of the B.C. & H. Power Station Co., Ltd., Carliol House, Ltd. (chairman), Edmundsons Electricity Corporation, Ltd., Industrial Plant Co., Ltd., Shropshire, Worcestershire & Staffordshire Electric Power Co., Ltd., and the South Wales Electric Power Co.



Mr. R. P. Sloan

Mr. Sloan's activities have extended to many branches of the electrical industry, and he has held office as president of the Incorporated Association of Electric Power Companies, the British Electrical Development Association, the British Electrical & Allied Industries Research Association, and the Electrical Industries Benevolent Association; vice-president of the Institution of Electrical Engineers and member of the British National Committee of the World Power Conference, the Grand Council of the Federation of British Industries, and King's College Council, Durham University. Mr. Sloan has acted on many committees dealing with electricity supply and gave evidence before the Williamson Committee in 1916 and the McGowan Committee in 1936.

Sir Edward Appleton, secretary of the Department of Scientific and Industrial Research, is to receive the honorary degree of Sc.D. from Cambridge University on June 13th.

The retirement is announced of **Mr. J. S. McCallum,** who had been the manager of the Callender Company's sales organization in Scotland, holding the position of Glasgow branch manager. Mr. McCallum was originally in the service of the Anchor Cable Co., which was taken over by the Callender Company in 1902. He therefore had forty-four years' service with the latter concern. Recently, former colleagues invited him to a special luncheon in London at which he was presented with a radio set and a cheque.

Mr. H. J. Gibson, previously divisional manager of the Central Division of the Shropshire, Worcestershire & Staffordshire Electric Power Co., has been appointed personal assistant to the general manager at the central offices, Halesowen. **Mr. H. A. P. Caddell,** previously district manager for the Redditch District, has been appointed divisional manager of the Central Division, which covers the districts of Kidderminster, Redditch, Bromsgrove and West Hagley. **Mr. R. Mallet** has been appointed district manager of the Redditch District. **Mr. E. C. Watson,** previously assistant district manager at Kidderminster, has been appointed district manager at Bromsgrove. **Mr. E. B. Willis,** previously district assistant at Redditch, has been appointed assistant district manager at Kidderminster.

Mr. H. J. Sheppard, B.Sc., A.M.I.E.E., A.M.I.I.A., has been appointed deputy borough electrical engineer and manager at Willesden, and expects to take up his duties there on May 1st. Mr. Sheppard obtained his degree with first class honours at Birmingham University in 1934. He has held various posts on the engineering staff of the Midland Electric Corporation for Power Distribution, Ltd., and since 1939 has been in charge of the Willenhall and Darlaston district of that company's system.

Mr. H. J. Sheppard

Mr. R. H. Yates, consumers' engineer in the Bacup Corporation Electricity Department, has secured a similar appointment with Crewe Corporation. He has been in the service of the Bacup authority for 25 years.

Mr. C. G. G. Boswood (hitherto secretary and general manager), **Mr. A. S. Gill** and **Mr. C. E. G. Nye** have been elected special directors of George Cohen, Sons & Co., Ltd. **Mr. R. S. Ferry** has been appointed secretary.

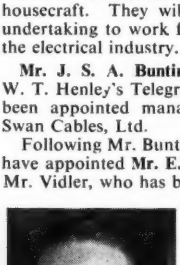
The Caroline Haslett Trust has now awarded its first Electrical Housecraft Scholarships to the following:—**Miss P. F. Stevenson** (Lytham St. Anne's) at King's College of Household and Social Science, University of London; **Miss Jean Cope** at the Glasgow and West of Scotland College of Domestic Science; **Miss V. M. Perks**

(Wolverhampton) at the Domestic Science College, Leicester; **Miss I. Frances Croxford** (Fowey, Cornwall) at the National Training College of Domestic Subjects, London and Torquay; and **Miss Betty Harral** (Blackburn) at the College of Domestic Economy, Manchester. Miss Harral's father is the Blackburn borough electrical engineer.

The scholarships are valued at £150 for the 1945-46 session. Scholarship holders will undertake normal training given at the domestic science colleges, and will be expected to take the E.A.W. certificate examination in electrical housecraft. They will be required to give an undertaking to work for a reasonable period in the electrical industry.

Mr. J. S. A. Bunting, late sales engineer of W. T. Henley's Telegraph Works Co., Ltd., has been appointed managing director of Edison Swan Cables, Ltd.

Following Mr. Bunting's resignation, Henley's have appointed **Mr. E. J. Vidler** sales manager. Mr. Vidler, who has been with the company for twenty-seven years, was appointed an assistant sales manager in 1937 and deputy sales manager in 1940. **Mr. F. Vaissiere,** assistant sales manager (engineering) since 1942, who has had twenty-two years' service with Henley's, becomes chief assistant sales manager, and **Mr. H. Hubbard,** chief technical assistant in the Engineering Department, becomes assistant sales manager (engineering).



Mr. E. J. Vidler

Mr. S. R. Gee

Mr. S. R. Gee, deputy manager of Henley's Liverpool Branch, has been appointed manager of that branch in succession to the late Mr. Kells. Before going to Liverpool in January of this year Mr. Gee was manager of Henley's Hull Branch.

Mr. A. Jarratt, mains superintendent with the Swansea Corporation Electricity Department, has retired after thirty-one years' service.

Nottingham Corporation Electricity Department gave a complimentary dinner on March 15th to twenty retiring members of the undertaking. **Councillor F. Mitchell,** chairman of the Electricity Committee, presided, supported by Councillor G. Willbery, vice-chairman, and members of the Committee. Mr. G. H. Lake, city electrical engineer and manager, proposing the toast of " Retiring Members," foreshadowed stupendous electrical development, and said it would need all their efforts and energy to fulfil obligations to consumers.

Mr. S. F. Bickell, M.I.E.E., has resigned his position as technical and works manager of British National Electrics, Ltd., to become chief development engineer of the Commercial Appliance Division, Parnall Co., Yate, nr. Bristol.

We are pleased to hear that **Mr. W. G. Trend,** chief electrical engineer and manager of the Bromley Electricity Department, is now well on the way to recovery after another long and painful illness, the result of wounds received in the 1914-18 war. He hopes to return to work in the near future.

Mr. C. F. Tyrrell, A.M.I.E.E., who for over fifteen years has represented Crompton Parkinson, Ltd., in Manchester, is now responsible for the sale of switchgear in Lancashire, Yorkshire, Northern Ireland and Eire. **Flt. Lt. J. B. Scott,** D.F.C. and Bar, has now resumed his duties with the company after four years in the R.A.F. and has been appointed manager of the Manchester office, plant division.

At the recent annual general meeting of the Electric Water Heater Manufacturers' Association **Mr. F. G. Nesbitt** was appointed chairman to succeed Mr. E. G. Batt, who wished to resign owing to his having too much work in other directions. **Mr. L. P. Haussauer** was elected vice-chairman of the Association in place of Mr. Nesbitt.

A dinner-dance in aid of the I.E.E. Benevolent Fund was held on March 8th, by the I.E.E. Mersey and North Wales Centre. The guests were received by the chairman of the Centre, **Mr. J. O. Knowles,** and Mrs. Knowles, and the function was most successful, approximately 300 members and friends attending. The Benevolent Fund will benefit by about £100 as a result of the function.

Mr. G. Kirk, technical assistant in the Accrington Corporation Electricity Department, has retired. He has been succeeded by **Mr. James Ostler.** Mr. Kirk has been in the service of Accrington Corporation since 1920. Before that he was chief assistant electrical engineer to Stafford Corporation.

Mr. Ernest Heaps, managing director of the Brighton Lighting & Electrical Engineering Co., Ltd., has been elected president of the Lancastrian Society of Sussex for 1946-47.

A dinner was held recently to celebrate the twenty-fifth anniversary of the Machine and Transformer Drawing Offices of the English Electric Company's Stafford Works. A hundred and fifteen draughtsmen and visitors were present, and Mr. E. H. Hassler (chief draughtsman) was in the chair, supported by Mr. A. D. Sloan (chief engineer) and Mr. J. W. C. Milligan (manager, Stafford Works).

Mr. H. B. Mellor, Associate I.E.E., has been appointed chief engineer to the Bective Electrical Co., Ltd. He was formerly senior installation and estimating engineer with Electricity House, Ltd., Leeds.

Mr. A. G. Lindars and **Mr. N. S. Richardson** have been appointed directors of Alliance Wholesale, Ltd.

Obituary

Mr. E. W. Dickinson.—We regret to record the death at Hounslow Hospital on March 16th in his seventy-fifth year, after a brief illness, of Mr. Edward Winram Dickinson, M.I.E.E., who until his retirement in 1933 was Rural Development Officer, Electricity Commission. After apprenticeship with Blakey, Emmott & Co., Halifax, Mr. Dickinson was appointed assistant in the Bolton Corporation Electricity Department in 1894, leaving two years later to take up a two years' appointment as chief engineer, Trinidad Electric Light & Power Co. From 1898 to 1903 he was assistant engineer to the British Electric Traction Co., and from 1903 until he joined the C.E.B. in 1926, he was with the London County Council as power station engineer at Greenwich.

Mr. W. Y. McAdam.—The death occurred at Hamilton on March 12th of Mr. William Y. McAdam, who had been in business as an electrical engineer for over twenty years. He was a past-president of the Electrical Contractors' Association of Scotland.

Will.—**Mr. A. Chilton,** of A. Chilton, Ltd., electrical wholesalers and factors, Watford, left £10,198.

PARLIAMENTARY NEWS

By Our Special Reporter

Severn Barrage

IN the House of Commons on March 12th Sir Stanley Reed asked the Minister of Fuel and Power whether, in view of the shortage of coal, it was now proposed to proceed with the recommendation of the Severn Barrage Committee to construct a new tidal model and to give the dock authorities the opportunity of being represented on a committee of hydraulic experts who would supervise its construction and operation.

Mr. Shinwell said that the matter was under review, but he was not yet in a position to make a statement.

Rural Electrification

Mr. Gooch asked the Minister of Fuel and Power whether he was aware that many rural electrification schemes were held up because of the difficulty experienced by companies in securing materials and men; and if he would facilitate the carrying out of these schemes in the interests of food production.

Mr. Shinwell replied that all possible steps would be taken to alleviate the position, but progress was bound to be slower than was desirable because of the limited supplies of labour and materials.

Col. Clarke asked if the Minister did not think that some of this delay was due to the authorities insisting on a too high standard of construction and if some simpler form could not be considered such as was used in countries abroad.

Mr. Shinwell replied that he was not aware of any obstacles being put in the way of electricity authorities wishing to undertake expansion, and if Col. Clarke knew of any such obstacles he would like to be informed of them.

Purchase Tax on Appliances

Mr. Oliver Poole asked the Chancellor of the Exchequer whether he would consider removing the purchase tax on electric kettles, irons and washing machines on the ground that these appliances contributed greatly to the conservation of fuel. Mr. Dalton replied that members would not expect him to anticipate his Budget statement.

E.D.A. Council 1946–47

AT the first meeting of the new Council of the British Electrical Development Association, Mr. H. J. Randall (City of London Electric Lighting Co.) was elected chairman for the ensuing year, and Mr. H. F. Carpenter (West Midlands J.E.A.) vice-chairman. The membership of the Council for the year is as follows:—

Appointed by:

Central Electricity Board: Messrs. H. F. Carpenter, A. J. Fippard, F. Nicholls, H. J. Randall and G. A. Vowles. I.M.E.A.: Messrs. R. Birt, J. Eccles, E. E. Hoadley, F. Newey, and Councillor J. Selwyn Jones. Power Company Members: Capt. J. M. Donaldson and Brig. Gen. R. F. Legge. London Electric Supply Association: Mr. Clarence Parker. Provincial Electric Supply Association: Sir John Dalton. Conference of J.E.A.s: Mr. J. Harwood Lumsden.

Nominated by Area Committees (deputies in parentheses):

N.W. England and N. Wales: Mr. G. A. Robertson (Mr. E. J. Cook); Northern Counties: Mr. T. E. Daniel (Mr. H. H. Mullens); S.W. England and S. Wales (N): Mr. C. L. Townsend (Mr. E. Jones); S.W. England and S. Wales (S): Mr. R. W. Steel (Mr. H. W. Knapp); Mid East England: Mr. A. Kelso (Mr. W. K. Fleming); Central England: Mr. G. W. Clarkson (Mr. F. H. Pooles); S.E. and E. England (Greater London): Mr. J. R. Jones (Mr. A. W. Bonell); S.E. and E. England (Eastern): Mr. G. P. Dixon (Mr. G. Christy); S.E. and E. England (Southern): Mr. S. J. C. Ellis (Mr. G. W. Daniels); Scottish: Mr. H. I. Hulme (Mr. W. D. Brassington) and Northern Ireland: Mr. W. J. Girvan (Mr. A. W. Ferguson).

There is one vacancy in the Central Electricity Board representation, Mr. C. D. Taite having resigned after nomination.

Saturation in Induction Motors

Method of Determining Value

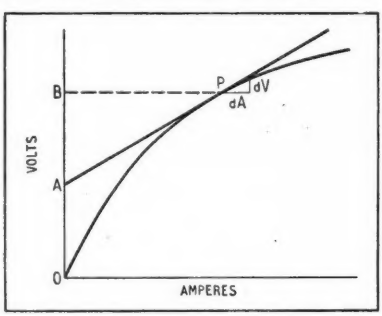
By T. Millar

THE term "saturation" in connection with the design of induction motors or similar machines is used loosely to define a condition where a small increase in voltage or flux necessitates a disproportionately large increase in magnetizing current or ampere turns. The existence of saturation is usually gauged by inspection of the magnetization curve as determined by test or calculation, and is often assessed by the position of the working point relative to the "knee" of the curve.

The conclusions arrived at by this method are not precise and are to some extent affected by the scales chosen for the two quantities represented.

The following method of assessing the degree of saturation existing in a particular design has the advantage of putting a precise value on the saturation at any point in a simple manner.

The basis of the method is to find the percentage increase in magnetizing current for a small percentage increase in voltage. For example in the lower, or unsaturated portion of the curve a 5 per cent increase in current will correspond to a 5 per cent increase in voltage. In other words the current is a linear function of the voltage.



Magnetization curve

Further up the curve we may find the condition that a 10 per cent increase in current is necessary for a 5 per cent voltage change. At this point in the curve, the current is obviously varying as the square of the voltage. Higher still a point will be reached where a 15 per cent increase in current is necessary, that is, where the current is varying as the cube of the voltage.

Referring to the figure, the method consists simply in drawing a tangent to the curve at the chosen point P. The saturation value is then given by the ratio of the voltage at the point to the difference between this voltage and the intercept of the tangent on the voltage axis, i.e., saturation value $= \frac{OB}{BA}$

This immediately gives the function of the current with respect to the voltage. For example if $\frac{OB}{BA}$ is found to be 2·5 then the current is varying as $V^{2\cdot5}$ at this point.

The mathematical explanation is as follows: At the point P, voltage $= V_1$ and current $= A_1$; then

$$\frac{\frac{dA}{A_1}}{\frac{dV}{V_1}} = \frac{\text{Percentage increase of current}}{\text{Percentage increase of voltage}}$$

$$= \frac{dA}{A_1} \times \frac{V_1}{dV}.$$ Now from similar triangles $\frac{dA}{dV} = \frac{BP}{BA}$; also $V_1 = OB$ and $A_1 = BP$;

$$\therefore \frac{dA}{A_1} \times \frac{V_1}{dV} = \frac{BP}{BP} \cdot \frac{OB}{BA} = \frac{OB}{BA}.$$

British Council Scholarships

FOR the current academic year over 300 British Council scholarships for study in Britain have been awarded to students from overseas. These scholarships, normally for one year with extensions in special cases, are granted to post-graduates and others of similar standing.

Besides providing these scholarships, the British Council advises, helps to place, and gives welfare assistance to many private students and those sent to Britain by their own governments. For this year a considerable number of scholarships have been awarded to students from European countries which were cut off from Britain during the war. Most of the students are in universities and colleges but some undergo training in engineering and other industrial works. There are 47 engineering scholarships and, apart from universities, etc., students have been placed with the following companies (among others):—The English Electric Co., Ltd., the General Electric Co., Ltd., International Combustion, Ltd., and the Metropolitan Vickers Electrical Co., Ltd.

London Transport

War Experiences and Future Plans

MUCH of the twelfth annual report of the London Passenger Transport Board, covering the year 1945, is devoted to an account of the way in which its indispensable services were maintained during the war period. The story commences with preparations made to meet possible enemy action at the time of the "Munich crisis" of 1938. One of the most important safeguards carried out before the actual outbreak of war was the installation of floodgates at the ends of the under-river tunnels (described in the *Electrical Review* of March 22nd, 1940). Protection was provided for all vital parts of the system; electric power supplies were interconnected and cables duplicated where necessary to ensure continuity of supply; and the ventilation system of the "Underground" was modified in preparation for possible gas attacks. Special attention was given to maintenance of communications and elaborate arrangements were made for rapid restoration of damage.

Air-Raid Damage

Reference is made to the early problems with which the Board was faced, including the evacuation of many thousands of women and children from London. The organization which had been built up proved its value during the period of continuous and severe raids in 1940-41 and particular mention is made of the worst of these, the 300-bomber raid of May 10th, 1941. Later in the war much damage caused by flying bombs and rockets had to be contended with. Details are given of some of the worst "incidents." Altogether there were over 4,000 incidents affecting the Board's property, including 559 relating to generating stations and substations. In addition 269 vehicles were totally destroyed (including 19 railcars) and damage was inflicted on vehicles on 9,368 occasions.

Mention is made of the use of tube stations as air-raid shelters, special Government traffics, and other wartime burdens which the system was called upon to bear.

A large part of the 1935-40 new works programme had to be suspended in the first few months of the war although the Board was allowed to finish some parts which were nearing completion, including the extension of the Northern Line from Archway (Highgate) to connect with the L.N.E.R. lines to Edgware and High Barnet and a connection between Baker Street and Finchley Road to enable Bakerloo Line trains to be projected over the Metropolitan Line to Stanmore. In addition, 19¼ route-miles of tram track were converted to trolley-bus operation.

The rest of the programme was well on the way to completion when interrupted by the war but the lapse of six years has raised new factors, especially in connection with town and country planning, the effect of which will have to be considered. Work is, however, being resumed on the north-eastern and western extensions of the Central Line and the electrification of the Shenfield line (L.N.E.R.).

Possible effects upon the Board's operations of town and country planning and the Greater London Plan are considered at some length in the report and the conclusion is reached that "any new pattern of the economic and social fabric of London will have its inevitable reactions on the future demands for transport which may render development of the Board's services on an economic basis more difficult. Nevertheless, it is the Board's duty to provide, in collaboration with the main-line railways, a properly co-ordinated system of passenger transport to suit the needs of the Board's area as they exist."

Among future improvements must be considered the possibility of constructing new high-speed tube railways to relieve congestion of existing lines, possibly by using the lengths of tunnel constructed for use as deep shelters during the war. But "any tube construction is costly and the problem of relating social needs with financial resources remains to be solved."

Traffic and Revenue

Traffic figures for the past seven years show that service car-miles run by the Board's vehicles fell from 573·4 million in 1938-39 to 463·1 million in 1945, while estimated total passenger-miles rose from 8,648·3 million to 9,805·5 million. Half of the passenger journeys in 1945 were by central buses; railways accounted for 15 per cent, country buses and coaches for 7 per cent, and trams and trolley-buses for 28 per cent.

The net amount received for 1945 under the terms of the Railway Control Agreement was £4,680,566; with other revenue the amount available was £4,687,352. Interest on prior-charge stocks required £3,901,381, leaving £785,971 for the service of the "C" stock, the interest on which is again 3 per cent for the year. A balance of £15,007 is carried to the "C" stock interest fund. Although the Board is required to redeem all stocks other than the "C" stock within ninety years of their date of issue nothing has yet been set aside for this purpose as contributions can only be made after the "C" stock has received the standard rate of 5½ per cent, which has so far not been possible.

Maintenance allowances have accumulated owing to the impossibility of keeping up the

pre-war standards and there is now an aggregate of £31 million in the trust fund established for the purpose.

Capital expenditure during 1945 was £958,371 net; estimated expenditure authorized by the Board at December 31st last was £7,400,000, including £4,800,000, at pre-war price levels in respect of works forming part of the 1935-40 new works programme suspended during the war. It is stated that owing to the substantial advance in costs the means of financing the extra expenditure which will be entailed is being discussed with the Ministry of War Transport.

Discussing future tasks and policy, the report refers to the proposed nationalization of transport services and says that as the Board has no knowledge at present of the Government's intentions as they will affect London Transport it assumes that after the lapse of the existing control agreement it will again become subject to the duties and obligations placed upon it by the Act of 1933. Attention is drawn to the higher operational costs which the Board has had to meet and it is stated that in these circumstances " some upward movement of fares is to be expected."

Details are given of the organization, including changes among the higher officers of the Board, and a list is given of honours awarded to officers and staff.

Canadian Electrical Advance

IN his presidential address to the winter conference of the Canadian Electrical Association last month, Mr. Wilson, of the merchandising division commercial and distribution department, Shawinigan Water & Power Co., Ltd., said that 80 per cent of Canada's potential power remained to be developed. Canada, with only about one-half of one per cent of the world's population, had become the third greatest trading nation and the fourth greatest producer of war weapons among the United Nations. This advance was made possible by a tremendous increase in the output of electrical power. Each step in expansion of the Dominion had been paralleled by an increase in power development. Since 1909 the generating capacity of the country had grown from 100,000 H.P. to 10,283,000 H.P. To-day Canada was second only to highly industrialized Sweden in consumption per head.

Electricity was one of the few services whose costs went down during the war years. The index of general living costs rose from 101 to 118 during the war but the cost of domestic electricity dropped from an index figure of 103 to 86.

The entire Canadian war production effort was, in one way or another, dependent upon the ability of the electrical industry to keep abreast of unprecedented demands. In the face of a critical man-power shortage, the industry developed new power, took power to new industries, kept its lines serviced and expanded its production to new peaks to meet the enormous needs of war. The power companies of Canada had well developed plans for the production of additional power. There was, for instance, the probability of a great increase in rural electrification and the establishment of new industries to " take up the slack " brought about by the ending of war production. Each of these new plants would need electrical power, and Canada, as well as the particular industries involved, would benefit because the power would be there ready for them at low cost. Mr. Wilson estimated that some $300,000,000 was ready to be spent on a wide variety of household appliances and equipment, a large proportion of them electrical.

Coal Utilization

A PAPER by MR. OLIVER LYLE which has been read before the Institute of Fuel in London, and is to be repeated at various provincial centres during the next two months is entitled " Inefficiency," the author endeavouring to indicate the very low overall efficiency with which coal is utilized.

By computation and estimation from figures already published, the author attempts to show that much coal is being " wasted " in many industries. He first records the amounts of coal consumed for different purposes, including the generation of electricity as well as power. The efficiency with which the power and electricity so derived are used in various industries is estimated and, by deducting from the total coal used in the particular industries that portion of fuel needed by each for power generation, the author arrives at the amount of coal used for heating. The estimation of efficiency in the last mentioned case seems to have been fairly easy in some industries, but very difficult in others.

Further estimates of the efficiencies of converting coal into gas and coke and of the uses of these secondary fuels are made to indicate that their overall efficiency is 38 per cent as compared with 2·2 per cent for power.

The middle section of the paper is intended to show that savings amounting to some 80 million tons of coal a year should readily be achieved, without departing from well-known methods, if the urge to economize were sufficiently great. The final section contains suggestions for a long-term policy and proposals for ensuring economy while the " fuel cosmos " of this country is being readjusted.

The author does not claim absolute exactness; but aims at figures of the right order of magnitude to enable him to focus attention on the " lamentable " state of affairs, to emphasize the " deplorable wastefulness " of power production and to lay bare the " stupendous inefficiency " of machines.

COMMERCE and INDUSTRY

Increased Output. Surplus Machine Tool Sales.

Generation of Electricity in February

OFFICIAL returns rendered to the Electricity Commissioners show that 3,462 million kWh of electricity was generated by authorized undertakings in Great Britain in February, as compared with the revised figure of 3,299 million kWh in the corresponding month of 1945, representing an increase of 163 million kWh or 4·9 per cent.

During the first two months of this year 7,605 million kWh was generated compared with the revised figure of 7,473 million kWh for the corresponding period of 1945, representing an increase of 132 million, or 1·8 per cent.

The total energy sent out from the generating stations of authorized undertakings during February (i.e., kWh generated less kWh consumed in the stations by auxiliary plant and for lighting, etc.) was 3,272 million kWh and in the first two months of the year, the amount sent out was 7,189 million kWh.

Industrial Intelligence from Germany

To secure for British industry the best industrial intelligence from Germany, it has been decided to bring over to this country not more than 200 German scientists and technicians to work in a purely advisory capacity for a limited period. Those chosen, all of them volunteers, will be research workers of exceptional brilliance or specialists in industrial techniques or processes likely to be of great interest and usefulness to British manufacturers. They will be employed by the Government, who will lend them to trade associations and research organizations. All inventions or discoveries will be used for the benefit of industry as a whole. In certain circumstances they may be attached to a particular firm, but there is no question of any German worker holding a position of authority or of replacing any British worker. They will be subject to the normal security safeguards attached to enemy aliens.

Machine Tool Disposal

Particulars of the methods adopted for the disposal of surplus machine tools were given by Mr. S. F. Steward, Director-General of Machine Tools, at a luncheon last week of the British Engineers' Association. Prices were fixed on the low side and Mr. Steward quoted some examples in which the price asked was about half of the price of the new machine. Machines were first offered to holding contractors and then to the incoming tenants of factories in which they lay. The remainder were available for disposal and were listed in the department's stock records in Birmingham, Bristol, Glasgow, Leeds, London and Manchester. A Cardiff centre was being opened shortly and it was hoped to have one for the North-East Coast. The machines were then available to tenderers whose offers were taken in strict rotation. When factories were to be cleared quickly site sales were held after being advertised in the press and at the disposal centres.

Mr. Steward urged prospective buyers to keep closely in touch with the disposal centres so that suitable machines could be selected and acquired as soon as opportunities occurred. He said that since the scheme began they had disposed of over 25,000 machines valued at over £7,000,000. When machines had been on offer for four months they could be bought for export at prices 20 per cent above those at which they had been offered to British industry.

Contract Price Adjustment Formulæ

The latest figures for the B.E.A.M.A. contract price adjustment formulæ are as follows: Rates of pay for adult male labour at March 9th, 95s (unchanged). Costs of material: the index figure for intermediate products last published by the Board of Trade on March 9th is 190·1 and is the figure for the month of February (compared with 189·5 for January).

Rubber Prices Reduced

The Ministry of Supply announced last week that as from March 14th the issue price to manufacturers in this country of natural rubber of standard sheet quality would be reduced from 1s 6d to 1s 4d per lb with appropriate reductions for other qualities. The price of general purpose synthetic rubber (GR-S) would be reduced from 1s 4½d to 1s 2½d per lb from the same date.

Strike at Cossor Works

Following the refusal of the company to concede a demand for an increase of 2d an hour in the pay of women workers, 2,000 employees at the Highbury works of A. C. Cossor, Ltd., went on strike last week. The company told the strikers that it could not discuss the matter while negotiations between the trade union and the Engineering Employers' Federation were in progress.

South African Lamp Factory

The first factory to be erected in Port Elizabeth's new factory area is an electric lamp works, an entirely new industry for the Union. The plant which is expected to be in operation in eight months has been built by a company of eight British firms which will operate jointly, financed partly by South African capital.—*Reuter's Trade Service.*

Tenants Form Company

Seven hundred tenants of Council houses at Ilkeston, Derbyshire, have decided to finance, through a limited company, the installation of electricity in their homes. This follows the Town Council's rejection of an application by the Council House Tenants' Association that the Council should finance the installations and allow tenants to repay the cost by means of a small addition to their weekly rent.

A company known as the Ilkeston Assisted Wiring & Electrical Appliances Co., Ltd., has been formed and has engaged its own wiring contractors. The electricity supply will be obtained from the Derbyshire & Nottingham-

shire Electric Power Co. It is expected that the scheme will cost in the region of £5,000. The Wiring Company offers to install four lights per house for £6 10s, with each extra light costing £1 8s, a two-way switch 16s, a 5-A plug £1 8s, the first 15-A plug £3 and additional ones £1 10s each. Hire-purchase terms are arranged, spread over two to four years.

The moving spirit behind the scheme is a former town councillor, Mr. J. Hoult, who stated at a recent meeting that the chief opponents were the Town Council, although 18 out of 24 members had electricity in their own houses. By quoting precedents, he eventually persuaded the Council to give permission for tenants to have the houses wired at their own expense.

Industrial Reconversion

Speaking at a meeting of the Engineering Industries Association in Manchester last week, Mr. J. W. Belcher, Parliamentary Secretary to the Board of Trade, again stressed the need for an increase in exports and hinted that the April Budget would contain provisions for assisting industry to speed up its reconversion to peace-time production.

The *Manchester Guardian* reports that Mr. S. Ferguson, who presided, drew attention to his own company which, although it had splendid prototypes and had had a million pounds' worth of inquiries from abroad, was not quite ready to go ahead. He asked Mr. Belcher to impress upon the President of the Board of Trade that there were young engineering works which needed support in order to enable them to get over the reconversion period.

Germans Run English Diesel Sets

In a letter to the English Electric Co., Mr. A. T. Allen, of Alderney, Channel Islands, says:—"In 1938 you installed for the Channel Islands Granite Co., Alderney, to the order of Messrs. S. H. Heywood, Manchester, two 6K 330-H.P., 600 r.p.m. Diesels, and I assisted in their erection and afterwards ran them until the evacuation in 1940. During the occupation they have been run by the Germans with very little attention and no spares. It might interest you to know that one of the engines, No. 1H762, ran for two years without stop, so that speaks well for the engines."

Skefko War Service

"A Factory Went to War" is the title of a handsome publication issued by the Skefko Ball Bearing Co., Ltd., telling the story of the company's work during the last six years. It is well produced and profusely illustrated and tells not only of the production of bearings for many parts of the war machine but also of the bringing of special steel from Sweden and the "human" side of the company's activities.

Planning Local Prosperity

An examination of the problem of preventing unemployment and of making the best use of the land and increasing amenities without further urban congestion and spoliation of the countryside, is made from the point of view of the locality in a 60-page publication by F. G. Fenelon, chief research officer of the British Engineers' Association, entitled "Planning Local Prosperity" (Art and Educational Publishers, Ltd., 54, Bloomsbury Street, W.1., price 1s. 6d.). Reference is made to the expansion of the electrical engineering, wiring and contracting industries, and to the possibilities of industrial development in Scotland resulting from the availability of hydro-electric power.

British Scientific Instruments in Sweden

The latest developments in British scientific instruments is the theme of an exhibition to be held in the Technical Museum, Stockholm, from May 24th to June 4th, under the joint auspices of the Scientific Instrument Manufacturers' Association of Great Britain, Ltd., and the Royal Institute of Scientific and Engineering Research of Sweden. Forty-one British manufacturers are exhibiting examples of their latest apparatus, and prominent British scientists, including Sir Charles Darwin, Director of the National Physical Laboratory, will deliver addresses on various British achievements in the fields of science. Films, illustrated lectures and demonstrations by technical experts will cover various special instruments and applications.

Hairlike Tubing

What is believed to be the smallest and lightest commercial metal tube in the world—its outside diameter is 0·006 in., its bore 0·0035 in., and 1 lb of tubing would measure 8⅝ miles—has been produced by the Tube Investments Group of engineering industries at Accles & Pollock's works, Oldbury, Birmingham. This minute tube was produced in the course of experiments to improve the delicacy of tubing used in scientific precision instruments, and has a bearing on the development of stainless steel hypodermic needle tubing.

Railway Electrification in Scotland

A scheme of electrification of railways, to be completed in stages, is proposed by the Clyde Valley Planning report submitted by Professor Sir Patrick Abercrombie, planning consultant. The scheme, includes electrifying underground railways and the lines to the coast, as well as the Cathcart Circle. Another suggestion for electricification is the line between Glasgow and Edinburgh. It is also proposed that there should be an airport railway station at Prestwick which would be connected to Paisley and Glasgow by electrified lines.

Scottish Power Costs

At a recent meeting of the Inverness County Council a letter was read from the North of Scotland Hydro-Electric Board stating it had been advised that it should be possible to supply electricity to a group of factories at between 0·25d and 0·3d per kWh, but that these were average figures. The county clerk also read a letter from Lt. Col. J. L. Hardie, of the British Oxygen Co., Ltd., saying that the company had been very anxious to establish a carbide industry in Inverness-shire. The original estimate of the cost of power under the Caledonian power scheme, rejected by Parliament, was 0·1d per kWh, and the figure of 0·25d or 0·3d put it out of the question. The Government had not decided what the policy

for the manufacture of carbide in this country would be, and the question would not come up before the board of the company until a decision was made by the Government.

Indian Aluminium Cable Works

Our Montreal correspondent says that a $300,000 factory for the production of aluminium conductors is to be built in Travancore State in South India with the collaboration of Aluminium Laboratories, Ltd., Montreal. Mr. K. K. Raman, director of Seshasayee Bros., Ltd., Trichinopoly, the holding company for the proposed plant, who has been conferring with the aluminium company, said that the Travancore Government was to be a partner in the enterprise and had promised financial aid, cheap power and land, and tax exemption because of the importance of aluminium conductors in Indian power development.

Canadian Electrical Trade

According to preliminary statistics issued in Ottawa, the value of Canada's exports of electrical apparatus last year was $60,957,000, compared with $71,700,000 in 1944, including radio apparatus, $35,949,000 ($51,475,000). The value of electrical apparatus imported into the Dominion last year was $43,052,000, compared with $57,859,000 in 1944, including radio apparatus, $15,635,000 ($33,434,000).

Argentine Agreement

The agreement on trade and commerce concluded between the United Kingdom and Argentina on December 1st, 1936 (Cmd. 5,324 of 1936) was due to expire on February 21st. It has, however, now been arranged that the agreement should be regarded as remaining in force for a further period of six months in the form of a "gentlemen's agreement."

Course for Teachers

Engineering teachers in technical colleges will have the opportunity of meeting together this year, for the first time since the war, under the auspices of the Ministry of Education. A course, designed primarily for teachers engaged in National Certificate work in mechanical, civil, production and electrical engineering, will be held at New College, Oxford, from July 22nd to August 1st. Teachers may elect to attend either the mechanical engineering or electrical engineering section of the course. Methods of teaching, and recent developments in engineering will be discussed in tutorial groups formed from members of the course and lectures will be given by eminent scientists and engineers, including Sir Lawrence Bragg, Professor A. J. Sutton Pippard, Sir William Halcrow, Mr. W. G. A. Perring and Mr. J. A. Ratcliffe. Full particulars of the course are obtainable from the local education authorities or direct from the Ministry of Education.

American Strike Ended

After being on strike for nearly two months, employees of the American General Electric Co. returned to work last week, having been granted a wage increase of 18½ cents an hour. About 75,000 Westinghouse Electric workers remained on strike at the time of the announcement of this settlement.

Paris Trade Fair

About 120 British firms are taking part in the Paris Trade Fair to be held from May 25th to June 10th. Altogether more than 7,000 firms are to be represented, nearly three-quarters of their exhibits being machinery.

Cotton Mill Lighting

At John Broadbent & Sons' Oakfield Mill, Droylsden, Manchester, the Manchester branch of Siemens Electric Lamps & Supplies, Ltd., has prepared a scheme for "Sieray" fluorescent lighting of the card room, designed to give a general overall lighting intensity of 8/10 ft-candles in accordance with the recommendations of the I.E.S. Code. The card room contains forty-four carding engines together with draw-frames, slubbing frames and intermediate frames, and it is one of the first card rooms in the cotton industry to be completely equipped with fluorescent lighting.

"Sieray" 2-tube fluorescent fittings over draw-frames at Oakfield Mill

In general "Sieray" FTF. 9180 reflectors have been employed, but because of difficulties in avoiding complicated overhead drive mechanism it was necessary to use type FTF. 9168 2-tube fittings over the draw-frames. All fittings are mounted at a height of 9 ft and in all 130 5-ft "Sieray" daylight tubular lamps have been employed. Adjacent single-lamp tube fittings are connected on different phases of the supply system and this, together with the

"twin lamp circuit" employed in the 2-tube fittings prevents the small amount of stroboscopic effect sometimes noticed with fluorescent lamps. To eliminate any risk of vibration, specially designed springs have been incorporated in the suspension of the fittings. The suspension was achieved by means of single strand steel wire to avoid the collection of cotton "fly." The electrical contracting work was carried out by J. R. Halliwell, Ltd.

Electro-farming at Huddersfield

Although essentially an industrial area, Huddersfield has 146 dairy farms, fifteen poultry farms and twelve horticultural premises connected to the electricity supply. To encourage the further use of electricity for farming purposes, the Electricity Department (engineer and manager: Mr. F. A. Ellis) is introducing a special farming tariff. Details of the attractive facilities now offered were given by Alderman J. L. Dawson when opening an exhibition of electrical farming equipment at the Electricity Showrooms. Provided that the whole of the farm premises are wired (not only the residential portion), electricity is to be supplied at ¾d per kWh with a fixed charge of 10s per quarter. Fifty yards of service connection are to be provided free, the cost of longer lines being spread over five years.

Tungsten Ore Price

The Ministry of Supply announces that the issue price of tungsten ore (other than high grade scheelite) has been reduced to 75s per unit of WO_3 delivered consumers' works in the United Kingdom. Allowances for impurities or low WO_3 will continue on the same scales as hitherto. For special high grade scheelite to the following specification: WO_3 minimum 68 per cent; tin maximum 0·60 per cent; arsenic maximum 0·10 per cent; molybdenum maximum 0·10 per cent, the price will continue to be 90s per unit of WO_3 delivered consumers' works in the United Kingdom.

Inquiries should be addressed to the Adviser for Wolfram to the Ministry of Supply, Steel House, Tothill Street, London, S.W.1.

"Fuel and the Housewife" Exhibition

To demonstrate how modern appliances and methods can be best employed to give the maximum comfort in the home with minimum fuel and cost, the Ministry of Fuel and Power, in conjunction with the Ministry of Works, the Coal Utilization Joint Council, the British Commercial Gas Association and the British Electrical Development Association, has organized an exhibition entitled "Fuel and the Housewife." This exhibition made its first appearance at the Building Centre, London, last week, and is to visit important centres of population throughout the country. It opens at the Royal Scottish Museum, Edinburgh, to-day, and will be seen later at Swansea, Birmingham, Manchester, Cardiff, Nottingham and Hackney.

The display consists of three kitchen bays each with three walls, exhibiting in turn gas, electric and solid fuel cooking. Two model electric kitchens, both intended for flats, are equipped with cooker, refrigerator, and "two-in-one" water heaters. One room is equipped as a dining kitchen, the other as a working kitchen. The operation of the water heaters is illustrated by means of a diagrammatic panel. Also included in the display is a kitchen-bathroom unit as installed in the emergency pre-fabricated bungalows, complete with cooker, wash-boiler, refrigerator, etc.

British Welding Research Association

The offices of the British Welding Research Association are now at 29, Park Crescent, London, W.1 (telephone: Welbeck 7485-9). All communications for the Institute of Welding should still be addressed to the Secretary, 2, Buckingham Palace Gardens, London, S.W.1.

Fire in Colliery Power House

At Wath Main coal mine, Yorkshire, where more than 2,000 miners are usually employed, all work was stopped following a fire in the power house. It was expected that the necessary repairs to the plant would take several days.

Trade Publications

English Electric Co., Ltd., Queens House, Kingsway, London, W.C.2.—Illustrated folder (DM/114) describing d.c. motors of the closed-air-circuit type for dusty situations, with cooling radiator on tops of the frames.

Churchill Machine Tool Co., Ltd., Broadheath, near Manchester.—Illustrated pamphlet (By. 5 No. 1188) on hydraulic grinding machines for various purposes.

Douglas (Kingswood), Ltd., Kingswood, Bristol.—Illustrated booklet, including tabulated dimensions and capacities, describing battery propelled vehicles (A.C.M.) of different designs for dairy, greengrocery, bakery and laundry door-to-door delivery work.

G.W.B. Electric Furnaces, Ltd., Dibdale Works, Dudley, Worcs.—Coloured brochure, with illustrations of modern installations, descriptive of box-type batch furnaces for carrying out various kinds of heat treatment and enamelling.

Wardle Engineering Co., Ltd., Old Trafford, Manchester, 16.—Consolidated price list for catalogue (L.33); also illustrated and priced leaflet (L.584/2) describing "Trafford" reflectors for 5-ft fluorescent tubes.

Applicants for copies of these publications should write on their firms' business notepaper.

Trade Announcements

The address of the Rockwell Machine Tool Co., Ltd., is now Clifton House, 83, Euston Road, London, N.W.1 (telephone: Euston 2241).

The address of the head office, works and stores of the Johnson Engineering Co., Ltd., is now 319, Kennington Road, London, S.E.11 (telephone: Reliance 1412/3).

S. Guiterman & Co., Ltd., have moved from Amersham to new premises at Alderman House, 37, Soho Square, London, W.1 (telephone: Gerrard 2571).

Hoover, Ltd., announce that they are re-instituting their vacuum cleaner service

Inspection Cards

An Indispensable Aid to Routine Maintenance

By F. G. Marshall, A.M.I.E.E.

ALTHOUGH the filing-card system has long been regarded as a necessity in office routine and has played its part in recording progress in connection with many new work projects, its use has not been extended in anything like the same degree to the practical side of routine maintenance of engineering equipment. The printed card is too often regarded exclusively as a record form to be neatly stowed away in a filing cabinet. Its value as a guide to the history of a machine or equipment is only one of its merits.

By the inspector, electrician or fitter who carries out the routine inspection the filling in of a detailed inspection card is in many cases looked upon merely as an irksome addition to already onerous duties. He remembers the days when his report on any routine examination consisted only of a verbal assurance to his chief that the equipment was in good order, and he often fails to realize that the cards are just as much an aid to himself as they are of service to his chief.

The use of inspection cards can best be examined from three viewpoints:—Those of the chief of the department, the office staff and the inspector. First and foremost, their main object is to provide a permanent record of appliances, from which the chief can ascertain at a glance the age and condition of all parts of the equipment and be aided in his decision whenever renewals are suggested by subordinates, although his other duties may prevent personal inspection.

Forestalling Serious Trouble

A rapid glance through successive inspection cards over a period will show if any trouble is developing, enabling him to make arrangements, if necessary, for a detailed overhaul or for a complete stripping of any portion in his repair shop before a fault has had time to develop to serious proportions.

In addition, the presence of a series of completed inspection cards on his desk constantly serves to remind the chief of all the various items of equipment under his charge, and prevents his overlooking any small but important piece of apparatus. By initialling each card as it arrives he records the fact that he has read it and lets his subordinates know that he is fully cognizant of the condition of that particular item.

In regard to the office staff, a clerk can keep check of the arrival of all the various cards on their correct dates to ensure that the periods between examination are not allowed to become extended, and the accountants can obtain information for costing and periodic assessing purposes.

But it is perhaps to the examining inspector, electrician, or fitter that the inspection-card system gives the greatest assistance. Whether they be daily, weekly, or monthly cards they ensure that both large and small items are attended to. The small action necessary in filling in the various items ensures that no vital part is missed through possible lapse of memory.

Fixing Responsibility

Such a system, then, keeps the inspector's work up to a definite standard and, in a large organization employing a number of inspectors, it definitely fixes responsibility for the efficient examination of every appliance and its components.

Regarding the form that the standard inspection cards should take: first, the card itself should be of stiff paper or, better still, of pasteboard, for it is essential that the inspector should take it along with him to the equipment under examination. To leave the filling in until his return to headquarters would neutralize the system, since the card is to act as a reminder to himself, in addition to being a report to his superior officer.

For this reason it should be small enough to go into a pocket, both sides being used. The wording on the card should be crisp and short, and, wherever possible, single words should be used. Sentences should be avoided, to distinguish the inspection card from an instruction card.

An inspector should never be allowed merely to put a tick after each item that he has completed. In all cases he should write a definite brief description such as "good," "fair" or "needs attention" with, of course, the date of inspection. A system such as that described is now more necessary than ever in order to ensure that ordinary routine maintenance is not neglected during periods of extensive new construction.

Indian Imports

Value Increases in 1945

STATISTICS of India's foreign trade for the six months ending September last have now been released. Those relating to the imports of electrical goods are shown in the accompanying table, with a note of increases or decreases compared with the April-September period of machinery show a marked increase over 1944 figures, total values amounting to £15,150,000 as compared with £10,365,000 in 1944. The value of imports of electrical machinery rose from about £2,250,000 to £2,400,000.

It is being continually urged in interested

Class	April - Sept. 1945 Rs. (000)	Inc. or dec. on Apl.-Sept. 1944 Rs. (000)
Fans and parts	23	– 132
From United Kingdom	13	– 140
„ United States	10	+ 8
Wires and cables, rubber insulated	4,665	+ 2,359
From United Kingdom	4,586	+ 2,512
„ United States	77	– 155
Wires and cables, insulations other than rubber	5,235	+ 3,409
From United Kingdom	4,087	+ 2,276
„ United States	1,148	+ 1,133
Telegraph and telephone wires and cables	213*	+ 56
Telegraph and telephone instruments and apparatus	1,614	+ 771
From United Kingdom	1,490	+ 820
„ Other countries	123	– 50
Gas-filled electric lamps	4,868	+ 3,942
From United Kingdom	2,062	+ 1,271
„ United States	2,805	+ 1,670
Vacuum electric lamps	640	+ 402
From United Kingdom	502	+ 349
„ United States	138	+ 53
Electric lamps for automobiles	41	+ 1
Electric bulbs for torches	385	+ 238
Other electric lamps	489	+ 468
From United Kingdom	166	+ 156
„ United States	291	+ 282
Radio receivers, complete	53	– 15
From United Kingdom	42	+ 2
„ United States	2	– 8
Radio valves	172	+ 47
From United Kingdom	54	+ 30
„ United States	118	+ 78
Component parts of radio receivers other than valves	349	+ 167
Other radio apparatus	192	– 83
Batteries for flash lamps	29*	+ 13
Other batteries	131*	+ 59
Electric carbons	807	+ 414
Accumulators	359	+ 470
From United Kingdom	354	– 417
Electric condensers	204	+ 73
Electric bell apparatus	45	+ 21
Electric lighting accessories and fittings	203	– 24
From United Kingdom	180	– 42
„ Other countries	23	+ 18
Electrical instruments (other than telegraph and telephone):		
Meters	272	+ 59
From United Kingdom	263	+ 55
Other Instruments	275	+ 81
From United Kingdom	192	+ 44
„ Other countries	83	+ 37
Electro-medical apparatus	310	+ 3
From United Kingdom	81	+ 34
„ United States	229	– 25
Switchboards, other than telegraph and telephone	256	+ 82
From United Kingdom	254	+ 81
Electrical porcelain ware	53	– 74
Electrical goods and apparatus not enumerated	2,247	+ 222
From United Kingdom	1,709	+ 894
„ United States	532	+ 369
Control and switchgear	4,839	+ 1,580
Generators, alternators and dynamos	885	+ 83
Motors	3,125	+ 146
Transformers	2,013	– 673
Turbo-generator sets	109	– 309
Other electrical machinery	3,562	+ 325

*Mainly from United Kingdom.

1944. It will be seen that the only noteworthy decrease was in transformers and turbo-generator sets. Among increases, those in wire and cables, telegraph and telephone material, lamps, radio parts, accumulators and batteries were outstanding.

While the United Kingdom was the main supplier, the United States took a rather larger share, notably in power plant, cables, lamps and unenumerated goods and apparatus. Out of a total import during the six months April-September, 1945, of electrical machinery valued at Rs. 14,534,000 (Rs. 13,383,000 in April-September, 1944), the United Kingdom supplied Rs. 11,726,000 (Rs. 11,751,000) and the United States Rs. 2,513,000 (Rs. 1,371,000). The rupee stands at about 1s. 6d.

A *Reuter* message from Calcutta states that for the whole of last year imports of millwork and circles that in view of the difficulties facing importers anxious to import capital goods, energetic measures should be taken to increase the manufacture of machinery and machine tools in India.

The need is now being stressed of constituting in both the United Kingdom and the United States an organization which would locate and examine available equipment, canalize all inquiries from India and furnish suggestions for the procurement of supplies from the various disposal boards.

The *Board of Trade Journal* for March 2nd contains a list of articles the importation of which is now covered by Open General Licence No. VII (applicable only to goods manufactured or produced in the sterling area). Newly added items include electrical instruments and accessories.

ELECTRICITY SUPPLY

Chesterfield "Scramble." Gloucestershire Farm Proposals.

Blackpool.—COMBINED SHOPS WITH DWELLINGS.—The "all-in" tariff for domestic consumers is to be made applicable to the residential part of shops with dwelling accommodation, subject to the consumer's carrying out the necessary alteration to the wiring system to enable the electricity supply to the residential part to be charged for separately.

Brighouse.—SUBSTATIONS.—Substations are to be provided at Granny Hall Lane and Clough Lane. Supplies of electricity are proposed to the mills of Ormerod Bros., Ltd., and to the British Silk Combers, Ltd.

Burton-on-Trent.—SUPPLY EXTENSIONS.—The Corporation Electricity Committee is to supply the Gresley Wood estate at a cost of £1,530.

Canterbury.—NO EXTENSION OF AREA.—The Electricity Commissioners have informed the City Council that no useful purpose would be served in considering the Council's suggestion that the electricity undertaking's area of supply should be extended, in view of the Government's intention to place the industry under public ownership.

Cardiff. — CHANGE-OVER. — The Electricity Committee has arranged with the Mount Stuart Dry Docks, Ltd., to undertake the change-over in the docks area, the Committee to provide the equipment at a cost of £6,000 and the company the labour (£2,500).

HEATING POINTS.—At a meeting of the Housing Committee the housing and estates manager reported that the cost of installing heating points was as follows: One additional heating point, £2 16s 0d; two, £5 5s 0d; three, £7 14s 0d; four, £10 3s 0d. He recommended that the rent of premises where additional heating points were installed should be increased by 2d per week for one additional point and a further 1d per week for each other point.

Chesterfield.—POSITION IN RURAL AREA.—At a recent meeting of the Rural District Council, when a member asked what was the result of the inquiry held last year, the engineer said that the position was that the Electricity Commissioners were unwilling to give a clear-cut decision and had told the Derbyshire & Nottinghamshire Power Co. and Chesterfield Corporation to apply for Fringe Orders. The result was just a scramble and the position was ridiculous.

ELECTRICITY FOR ESTATE.—The R.D.C. has decided to ask the Corporation to give a supply of electricity to new housing estates at Brimington and Calow.

SUPPLY TO B.T.H. CO.—At a meeting of the Corporation Electricity Committee the electrical engineer reported that the British Thomson Houston Co., Ltd., had notified its desire to increase its maximum demand and to take the high-voltage supply at two new substations instead of at the existing substation. The Committee agreed to afford the additional supply on condition that it was responsible only for supplying and installing the new h.v. feeder switches and h.v. cables to the new substations, all other apparatus and the substation buildings being the responsibility of the company. It was decided to apply for permission to borrow £1,720 for the purpose.

CAPITAL EXPENDITURE.—The Electricity Committee has approved an estimate of £248,358 for capital expenditure during the next twelve months.

Dartford.—COOKER HIRE.—The Electricity Committee has decided that cookers to be installed in new houses shall be hired at 9d per week (10d when thermostatically controlled).

Gloucestershire.—RURAL SUPPLIES.—At a meeting of the Gloucestershire Branch of the National Farmers' Union, Mr. I. R. Morris (Tetbury) outlined a scheme proposed by the West Gloucestershire Power Co. for the southern part of the county which aimed at the provision of electricity supplies to areas or parishes, or groups of parishes. He said that the first group was a voluntary one in the Charfield area where 21 out of 24 farmers had signified their intention of joining the scheme. It was not expected that a start would be made until October next. Mr. W. Ball (Winchcombe) said that milk producers could not possibly fulfil all their requirements unless they had electricity on the farms.

Hastings.—HIRE CHARGES INCREASED 50 PER CENT.—A recommendation of the Electricity and Public Lighting Committee that the charges for the hire of electrical apparatus should be raised 50 per cent has been approved by the Town Council. A report on hire-purchase is to be submitted soon.

Horwich (Lancs).—UNDERTAKING'S FINANCES.—The final accounts of the Council's electricity undertaking for the past three years were considered at a meeting of the Finance Committee, when the chief financial officer reported that sums had been taken from reserve as follows: 1943, £1,500; 1944, £1,180; and 1945, £1,579. On March 31st, 1945, the sum of £1,795 was left in reserve. It was difficult to estimate the prospects of the undertaking, in view of the present high cost of electricity in bulk, the increase in the administration charges, and the fact that no increase in tariffs had been allowed during the war. The Electricity Commissioners had approved the Council's application for consent to increase certain tariffs, subject to reservations.

Lichfield.—ELECTRICITY CHARGES.—A proposal to increase charges by 10 per cent has been rejected by the Electricity Committee, which has decided to review the position when final accounts for 1945-46 are available.

ELECTRICITY FOR ESTATES.—The Electricity Committee has obtained sanction to borrow £14,100 for supplying electricity to the Stowe and Cherry Orchard estates.

Newport (Mon).—PRICE REDUCTION.—As from the quarter ending in June next the remaining 5 per cent. of the temporary wartime advance in electricity charges is to be discontinued. In addition, the Electricity Committee proposes

to consider a reduction in the present tariff for lighting purposes when the 1945-46 accounts are available.

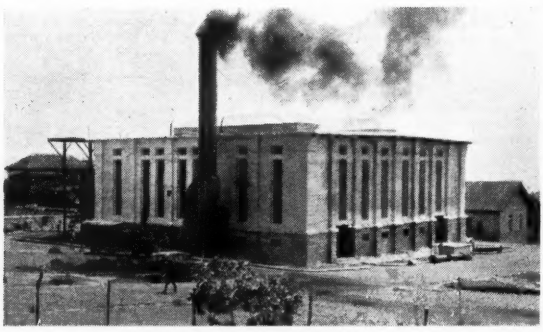
Northern Ireland.—THE ERNE SCHEME.—In the Northern Ireland House of Commons the Minister of Finance (Major Maynard Sinclair), stated that no communication had been received from the Government of Eire respecting the utilization of the water power of Lough Erne for the generation of electricity, but informal approaches had been made by the Electricity Supply Board of Eire to the Northern Ireland Ministries of Finance and Commerce, concerned with the supervision of statutory levels. The informal discussions referred to technical matters. There was no question of the Northern Ireland Government refusing to co-operate.

Oldham.—LOAN.—The Electricity Committee is to apply for sanction to borrow £160,000 for an additional 20,000-kVA transformer, 33-kV mains and pilot cables. Switchgear and new substations will also be required, to meet industrial development in the Royton and Crompton areas.

Paisley.—POWER STATION RECONSTRUCTION. —After discussing reconstruction of power station buildings at Blackhall at an estimated cost of £8,324, the Corporation Electricity Advisory Committee recommends applying for borrowing powers.

IMMERSION HEATERS FOR HOUSES.—The Committee is considering installing immersion heaters in Corporation houses.

South-West England.—ELECTRICITY SCHEME ADOPTED.—The Central Electricity Board has adopted, without modification, the South-West England and South Wales Electricity (Alteration and Extension) Scheme, 1946, details of which have already been published (*Electrical Review*, January 18th, 1946).



Blackhall Road power station, Freetown, Sierra Leone

Sunderland.—PURCHASE RIGHTS.—A meeting of local authorities is to discuss the purchase rights of local authorities under the South Shields Rural Electric Lighting Order, 1903, and the Sunderland District Electric Lighting Order, 1904.

RELIEF OF RATES.—The Corporation is to take £12,500 from the profits of the electricity undertaking to relieve the general rates. A suggestion to appropriate money from the Transport Department for similar purposes was not supported. The transport and electricity undertakings, between them, have reserves amounting to £333,000.

Swinton.—INSTALLATIONS IN NEW HOUSES.—An estimate by the Electricity Committee shows that electrical installations in Council property to be erected during the first-year housing programme will cost £4,150.

Torquay.—POWER STATION EXTENSIONS.—The Corporation Electricity Committee is to provide coal and ash-handling plant costing £34,663 at the Newton Abbot power station extensions.

Overseas

Australia.—NEW ADELAIDE STATION.—Construction of the first half of the Adelaide Electric Supply Co's new 180,000-kW steam power plant (Osborne "B") is expected to be completed by the end of this year. Work on the second section is scheduled to begin in 1949. The estimated cost of the project is £5,700,000.

Rumania.—PROPOSED DANUBE BARRAGE.—The erection of a barrage dam on the river Danube to provide electricity for two-thirds of Rumania will begin this spring according to Bucharest radio.—*Reuter.*

Sierra Leone.—NEW POWER STATION FOR FREETOWN.—A new power station with oil-fired boilers and steam turbines was constructed at Blackhall Road, Freetown, to meet the increased demands for electrical power during the war. The power station building is designed for three turbo-alternators with a total capacity of 3,000 kW. The first section is now in commission and comprises two 13,000 lb per hour Babcock & Wilcox water tube boilers and one 750-kW Belliss & Morcom turbo-alternator. The boilers are oil fired and arrangements have been made by which either furnace oil or palm oil can be used.

South Africa. — ORLANDO STATION EXTENSION.—The first stage of development of the Orlando power station, Johannesburg, will be completed with the installation of a new turbo-alternator which is expected to be ready this month. On two previous occasions generators for this purpose were sunk by enemy action, and delivery of parts of the present plant was delayed by the dock strike in Britain. Like the station's first set (commissioned in February, 1942) and the second (October, 1943) the new turbo-alternator has a capacity of 30,000 kW. The Council is seeking authority from the Transvaal Administrator to start Orlando's second stage by ordering immediately two additional 30,000-kW sets.

PROGRESS AT DURBAN.—In the year ended July 31st last the Durban municipality sold 287 million kWh, an increase of 7 per cent on the previous year's sales. Energy purchased in bulk from the Electricity Supply Commission cost 0·312d. per kWh.

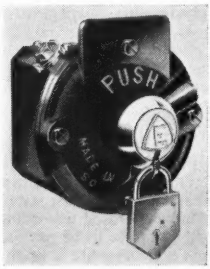
RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Emergency Push-switch

THE latest push-button switch to be announced by GEORGE ELLISON, LTD., Perry Barr, Birmingham, 22B, has been designed to satisfy the factory inspectorate's requirement that when an electric motor has to be stopped remotely in an emergency the trip switches utilized must be of the hand-resetting type and, further, that provision should be made for padlocking them in their " trip " position.

A single blow on the push knob opens or closes a trip coil circuit which remains " operated " until the switch is reset by hand. Provision is made for padlocking the push knob, either " on " or " off," and the switch can be readily converted from hand-resetting to self-resetting by removing a small spring from the ball-catch mechanism. It is rated at 5 A continuously at 660 V and is single-pole double-break. Two sets of contacts are provided and they can be connected for independent circuits or they may be linked together to form a single two-way combination. Spring loading of the moving contact ensures adequate pressure.



Emergency trip switch for motors

The iron cover and case have ground jointing surfaces. The case may have clear or tapped holes for conduit; alternatively, compression glands or clamps for armoured cable can be supplied. The switch can be mounted to receive cables approaching from the top, bottom, or sides and the cover can be secured " the right way up " irrespective of the direction of the cable approach.

Heating Jackets

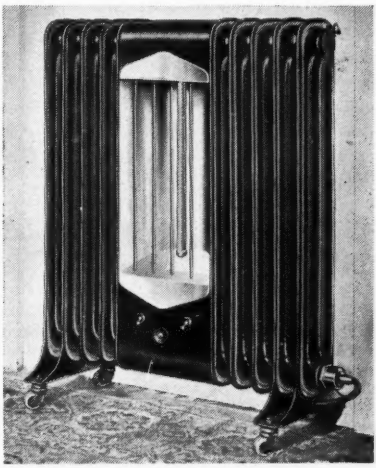
Fabric muffs for jacketing pipes and fluid containers which need to be heated externally in order to maintain the flow of viscose substances, are being made by S. B. JACKSON, LTD., Windsor House, Victoria Street, London, S.W.1. The muffs are made up of pads of glass silk with the heating elements sewn into the fibre; if necessary, they can be completely covered with additional insulation. Their electrical loading can be arranged to suit individual requirements and most ordinary voltages, while thermostatic control of temperature can be applied simply. The flexibility of the padding enables it to conform to most contours. Muffs can be designed to surround the mechanical parts of motor-operated valves working in the open, as in hydro-electric power plant, to prevent sticking and freezing in cold weather.

Clothes Iron

The household smoothing iron which has been named " Challenger " by the REVO ELECTRIC CO., LTD., Tipton, Staffs., has a generously bevelled soleplate containing a mica-insulated element loaded at 450 W. Thumb and heel rests are provided as well as a connector cup to contain the terminal assembly in conformity with BSS requirements. All metal parts are nickel plated and the iron weighs 5 lb.

Radiator-fire Combination

Space-heating radiators of the hot-water type, now in production by MORRIS HEATING APPLIANCES, LTD., 5, Netherton Grove, London, S.W.10, are made of pressed steel and fitted with four castors for mobility. The immersion heater element may be of either 650 or 850 W.



Combination direct and water radiator for room warming

Of the seven models offered, four are "Radfire" combinations having an additional wound element " fire," of 1,000 W loading in each case, inset vertically in the centre of the water radiator. Two models are available with a " pencil "

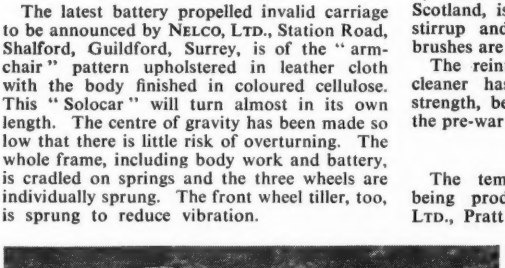
element backed by a parabolic reflector and two others with a fire-bar element. Separate switches are built-in to permit either, or both, radiant and water convection heat to be utilized.

Socket Outlets

In order to ease production and reduce the variety of types which distributors have hitherto had to stock, M.K. ELECTRIC, LTD., Wakefield Street, Edmonton, London, N.18, has decided to discontinue making some of the items previously listed. Thus all " open " type three-pin sockets and switch-sockets have been dropped in favour of the retention of the " Anti-flash " design which the company introduced nearly twenty years ago.

Invalid Carriage

The latest battery propelled invalid carriage to be announced by NELCO, LTD., Station Road, Shalford, Guildford, Surrey, is of the " armchair " pattern upholstered in leather cloth with the body finished in coloured cellulose. This " Solocar " will turn almost in its own length. The centre of gravity has been made so low that there is little risk of overturning. The whole frame, including body work and battery, is cradled on springs and the three wheels are individually sprung. The front wheel tiller, too, is sprung to reduce vibration.



The battery " Solocar "

The selection of motion (forward, coasting, reverse and braking) is done by rotating the tiller control handle; additional electrical braking positions on the controller restrict the speed when descending hills. The speed can be adjusted to enable a pedestrian to travel alongside with comfort. The frame is made of pressed steel and a one-piece aluminium casting encloses the rear axle, to which power is transmitted through all-enclosed worm and parallel-type differential gearing. The wire wheels and pneumatic tyres are of standard types and sizes.

The electrical controller provides four speeds forward and two in reverse; also a two-speed range switch permits choice of speed on the level of 6 or 12 m.p.h. In addition to the two electric braking positions, friction brakes in the rear wheels and a further brake on the shaft of the driving motor are operated by side levers. The 36-V battery has a capacity of 68 Ah at the five-hour rate, for a working range of 40 miles. A rectifier is available for simple " plug-in " recharging from single phase a.c. mains. The running cost with electricity at 1d. per kWh, is about 1d. for ten miles. The carriage is equipped with a voltmeter and ammeter, three electric lamps, an electric horn, apron, kit of tools, number plates and driving licence holder. This kind of vehicle is exempt from road tax, but third party insurance is compulsory.

Floor Cleaners

The floor polishing machine manufactured by VACTRIC, LTD., at Chapelhall, Airdrie, Scotland, is now being finished in black with stirrup and handle chromium plated; three brushes are provided.

The reintroduced " Junior " model suction cleaner has a one-piece handle of greater strength, being otherwise essentially similar to the pre-war household model.

Ceramic-top Iron

The temperature-controlled " Streamiron " being produced by THERMIONIC PRODUCTS, LTD., Pratt Walk, London, S.E.11, has a pre-selector dial calibrated according to the kind of fabric to be pressed and a pilot " Regu-lite " at the back of the handle. There are two models: one with a pressed steel cover and the other with a ceramic top, both finished in coloured enamel and weighing 5·5 lb.

Loudspeaker

The loudspeaker, unit K11/9, originally designed for public address work by GRAMPIAN REPRODUCERS, LTD., Hampton Road, Hanworth, Middx., is now available from stock in a modified form at a lower price for use where space and cost are limiting factors.

The magnet is of the 30-oz size with thick top and bottom plates and a pole piece of high permeability steel, producing a flux density of 9,500 lines. A special dust cover interlocks the pole and top plate to ensure concentricity of the air gap. The suspension is of the back three-point type, which permits appreciable diaphragm movement. A dome is fitted to the apex of the diaphragm to close the gap against dust. The plate and pole pieces are cadmium plated and the drawn steel chassis is " Bonderized " before being sprayed with paint.

This speaker can be supplied with speech coils of 2 or 15 ohms while tropically finished cones and coils are available for use in damp situations.

Lighting Industry Prospects

E.L.F.A. Report for 1945

NEVER before has there been such widespread need for good modern lighting, and never has the lighting industry had so great an opportunity to serve the needs of the nation. Expressing this opinion in the annual report of the Electric Light Fittings Association, Mr. A. E. Iliffe (chairman) states that the rehabilitation of the industry involves long-term planning for the future.

In this direction the Association has been especially active. The Decorative and Commercial Lighting Fittings Section has been negotiating with the associations concerned with a view to more equitable rates of discount. The Industrial Section has worked out a complete Fair Trading Policy, and the Street Lighting Section has produced and adopted a complete Fair Trading Code for its side of the industry. A revised and greatly enlarged schedule of conditions for fluorescent lighting fittings has been prepared by the Fluorescent Fittings Committee and has been adopted.

The Association is represented on the Advisory Panel being formed to deal with the problem of the disposal of Government surplus stocks. In collaboration with the Electric Discharge Lamp Auxiliaries Council and the Electrical Wholesalers' Federation, the Association is revising its register of approved wholesalers. Negotiations are taking place with the E.D.L.A.C. with a view to securing to members of the Association an adequate supply of auxiliary gear on mutually satisfactory terms.

Among subjects which the Technical Committee has studied are: bayonet caps for 200-W lamps, bi-pin caps for fluorescent lamps, E.27/25 caps for 200-W lamps, g.e.s. lampholders (use of spring grip devices), filament gap position, mirror glassware, measurement of "cut-off" with various types of lamps, standardization of well glass dimensions, standardization of neck and flange dimensions, vitreous enamel test specification, street lighting (draft specification), and fluorescent trough reflectors (continuous alignment and standard suspension centres). The conclusions reached will be issued to members in the form of technical data sheets.

Having served the Association for seven years as chairman, throughout a period of exceptional difficulty for the industry, Mr. Iliffe has decided to retire from the chairmanship.

Forthcoming Events

Monday, March 25th.—*Newcastle-on-Tyne.*—Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North Eastern Centre. Paper on "The Place of Radiant Dielectric and Eddy-Current Heating in the Process Heating Field," by J. L. C. Connell, O. W. Humphreys and J. L. Rycroft.

Tuesday, March 26th.—*Glasgow.*—Royal Technical College, George Street, 6.15 p.m. I.E.E. Scottish Centre. "The Control of Electrical Installation Work," by W. R. Watson.

Loughborough.—Loughborough College, 6.30 p.m. I.E.E. East Midland Sub-Centre. "Recent Progress in the Design of the High Voltage Overhead Lines of the British Grid System," by W. J. Nicholls.

Tuesday, March 26th, to Friday, March 29th.—*London.*—Institution of Electrical Engineers. Four-day Radiolocation Convention.

Wednesday, March 27th.—*London.*—Conway Hall, Red Lion Square, 1.30 p.m. British Association for Commercial and Industrial Education. Annual general meeting. Combined with this a one-day conference will be held commencing at 10 a.m.

Wednesday, March 27th, and Thursday, March 28th.—*London.*—Kingsway Hall, W.C.2. Federation of British Industries. Conference on Industry and Research, to be opened by Sir Robert Robinson.

Thursday, March 28th.—*London.*—S.E. London Technical Institute, 8 p.m. Electrical Engineering Society. "Quartz Crystals," by R. H. Robins.

Friday, March 29th.—*Newport.*—King's Head Hotel, 7 p.m. I.E.E. Cardiff Students' Section. First annual dinner and dance.

Tuesday, April 2nd.—*Coventry.*—Electricity Showrooms, 6 p.m. Coventry Electric Club. "Television," by C. H. Crocker.

Manchester.—Engineers' Club, Albert Square, 6 p.m. I.E.E. North-Western Centre (Measurements Group). "Theory of Servo Systems," by A. L. Whiteley.

Leeds.—Electricity Department, Whitehall Road, 6 p.m. I.E.E. North Midland Centre. "Three-phase Distribution and Electric Welding and Furnace Loads," by A. Langley Morris.

Northmet Station Inquiry

THE Electricity Commissioners have given notice of their intention to hold an inquiry into the application of the North Metropolitan Power Station Co. for consent to the erection of a new generating station in the urban district of Hoddesdon, Herts. The inquiry will be held jointly with one by the Ministry of Town and Country Planning following an appeal by the company against the Hoddesdon Urban District Council's refusal to issue a general development order permitting the erection of the station.

The joint inquiries will be held on March 26th at the Hoddesdon Council's offices when interested parties will be afforded an opportunity of giving evidence. Copies of the plans for the station may be inspected at the offices of the Council during normal office hours.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Associated Electrical Industries, Ltd.—A net profit of £542,817 for 1945, compared with £467,543 for 1944, is shown in a preliminary statement, after deducting depreciation and taxation and making provisions for reserve and contingencies. For the tenth successive year it is proposed to pay an ordinary dividend of 10 per cent.

Additional £1 ordinary shares are to be offered to stockholders registered on March 30th, in the proportion of one for each complete £5 of stock held, at 50s per share. The present authorized ordinary capital is £5,161,950 of which £4,921,838 has been issued. The offer calls for 984,367 ordinary shares and the issue thus involves a sum of about £2,500,000, for which consent has been obtained.

The British Aluminium Co., Ltd., records a gross profit for 1945 of £1,019,440, compared with £1,049,257 for 1944, but the 1945 figure includes an estimated E.P.T. refund of £246,000, whereas in 1944 an undisclosed amount was provided for E.P.T. Income tax provision amounts to £456,000 (£442,000) and sums of £175,000 and £75,000 respectively are again allocated to debenture service fund and reserve for depreciation. The final ordinary dividend is reduced from 7 to 6 per cent, making 8 per cent (10 per cent) for the year, and after transferring £125,000 (same) to general reserve, £285,516 (£280,691) is carried forward.

Hoover, Ltd.—The accounts for 1945 record a trading profit of £598,001 (against £574,967 for 1944). The net profit after deducting £317,513 (£440,369) for taxation was £278,338 (£129,317). General reserve receives £100,000 (nil) and £30,000 (nil) is allocated to research and development. The final ordinary dividend is 21¾ per cent (11¼ per cent), making 25 per cent (15 per cent), plus a bonus of 5 per cent (10 per cent), and £50,973 (£39,135) is carried forward. The report states that the reconversion of factories is progressing satisfactorily and development and production of other products is proceeding.

International Combustion, Ltd.—At the company's annual meeting the chairman (Mr. G. R. T. Taylor) recorded that since his last review further large orders had been received for export and the total volume of orders in hand was greater than ever before. He added a warning, however, that notwithstanding these and other favourable factors the position was obscured by increased difficulties which had appeared in the supply of both labour and materials. In addition, certain legislative restrictions which had not yet been removed were proving very irksome and were definitely detracting from the splendid efforts their workpeople were making. As their principal business was the manufacture of steam-raising plant for electricity generation, anything which retarded their progress in this direction was cumulative and had an adverse effect upon the fortunes of the nation as a whole.

In the course of his speech the chairman reviewed the war activities of the company and mentioned the introduction of a contributory pension scheme for manual workers on similar lines to that instituted for the staff at the beginning of the war. He said it was intended to narrow the margin between interim and final dividends which, if the profits were the same in the current year, would be 10 and 22½ per cent respectively.

The National Gas & Oil Engine Co., Ltd., records a profit for 1945 of £48,127 (against £45,569), including adjustment of Government contracts and after making provision for depreciation, taxation, etc. The ordinary dividend is maintained at 5 per cent and £40,240 (£35,113) is carried forward.

The chairman (Lord Falmouth) states that the company has a full order book, mainly for export, which will keep the factory fully occupied for the next two years, but he emphasizes the importance of output being stepped up.

Bruce Peebles & Co., Ltd.—After making provision for taxation and transferring £20,000 (same) to depreciation reserve the net profit for 1945 amounted to £20,367 (£22,554), of which £10,000 (nil) is applied to general reserve. A dividend of 5 per cent and a bonus of 3 per cent are again being paid on the ordinary stock and £16,208 (£15,506) is carried forward.

Switchgear & Cowans, Ltd.—The net profit for 1945 was £20,376, compared with £22,632 for 1944, after providing for depreciation and taxation and, in the case of the 1944 figures, war contingencies. In addition to maintaining the dividend at 20 per cent, it is proposed to pay a bonus of 5 per cent (nil last year). Reserve receives £2,000 (£2,324) and £22,268 (£20,392) is carried forward.

Lancashire Dynamo & Crypto, Ltd., in a preliminary statement, shows approximate profits of £135,000 for the past year against £134,313 for 1944. A final ordinary dividend of 10 per cent and a bonus of 7½ per cent are again recommended, making 22½ per cent (same) for the year.

Ericsson Telephones, Ltd., proposes to pay a final ordinary dividend of 12 per cent and a bonus of 3 per cent, both free of tax. The total distribution for the year is thus maintained at 20 per cent tax free. The net profit for 1945 was £112,912 (against £116,507).

City of London Electric Lighting Co., Ltd.—The chairman (Mr. John Braithwaite) stated at the annual meeting last week that in large parts of the area of supply they would soon have to reconstruct their distribution system. To set up again duplicate systems was unthinkable, and they had negotiated with Central London Electricity, Ltd., a working agreement, now awaiting the approval of the Electricity Commissioners, whereby both capital expenditure and net revenue would be shared in agreed proportions.

As to nationalization, he said they did not

consider it in the best interests of the nation and would join with all those—he believed they represented almost the whole industry—who took the same view. In London the supply companies were in a special position because their continuation until 1971 was settled by the 1925 Acts which were in the nature of a Parliamentary bargain and, he suggested, could not lightly be set aside. If there existed a case for nationalization of the industry, it was certainly not because of inefficiency. Referring to the industry's own proposals as set out in the "White" memorandum issued jointly by the municipal and company associations, he said that supplying electricity was essentially a matter for local control and action. Control on the lines of the 1925 Acts for London would, in his judgment, cause practically no disturbance of capital and yet would completely safeguard the best interests of the nation.

Regarding the rebuilding of the Bankside generating station, he said that discussions had taken place with the various planning authorities and it was hoped that a decision would be reached in the near future. Every step would be taken to ensure that the rebuilt station should be both technically and architecturally up to the highest standards.

Shropshire, Worcestershire & Staffordshire Electric Power Co.—The net revenue from the sale of electricity, etc., last year amounted to £1,100,502 (against £1,359,604 for 1944) to which are added credit from C.E.B. £27,952 (£31,492) and interest, etc., £16,084 (£12,593), making £1,144,538 (£1,403,689). The net balance was £166,515 (£161,212) after providing, *inter alia*, for rates £130,783 (£116,296), taxation £135,000 (£400,000), and loss on shares in subsidiary company liquidated during the year £10,853, and contributing £400,000 (same) to reserve; last year £25,000 was in addition set aside for contingencies and repairs. Final dividends are recommended of 4 per cent on the "A" ordinary and 3 per cent on the "B" ordinary shares, again making 8 and 5½ per cent respectively for the year, and £116,504 (£108,739) is carried forward.

The Midland Counties Electric Supply Co., Ltd., in addition to a final dividend of 5 per cent (same), is paying a bonus of 2½ per cent, both less tax at 9s, making a total distribution for the year of 10½ per cent (against 8 per cent). The trading profits of the operating companies for 1945, after provision for taxation, amounted to £943,950 (£850,919), of which £577,428 (£521,897) is appropriated for the operating companies' depreciation and reserves.

The Newcastle & District Electric Lighting Co., Ltd., in its accounts for 1945, shows receipts amounting to £237,377 (against £221,190 for 1944) and a profit of £80,511 (£70,485), plus £1,683 (£1,642) interest on investments. Income tax absorbs £11,093 (£11,032), and allocations include £9,000 (nil) to general reserve. The dividend for the year is unchanged at 7 per cent, and £14,620 (£14,720) is carried forward.

The Northampton Electric Light & Power Co., Ltd.—The accounts for 1945 show that net revenue from the undertaking amounted to £133,853 (against £220,081 for 1944). After adding interest received and £50,000 E.P.T. recoverable and meeting debenture and other charges (which in 1944 included £40,000 provision for E.P.T.) the balance amounted to £166,931 (£158,365). Income tax absorbs £69,000 (£96,000), an additional contribution of £20,358 (nil) is made to the pension fund and £20,000 (£15,000) is transferred to reserve. The ordinary dividend is maintained at 10 per cent and £111,050 (£98,290) is carried forward.

The Rushden & District Electric Supply Co., Ltd., in its accounts for 1945, shows a net revenue from the undertaking of £24,707 (against £30,663). After adding other income and meeting charges, including £8,000 (£16,722) E.P.T. provision, the balance is £15,013 (£11,702), of which £10,120 (£5,794) is provided for income tax. The ordinary dividend is maintained at 9 per cent for the year and £13,642 (£13,799) is carried forward.

The Bournemouth & Poole Electricity Supply Co., Ltd., in its accounts for 1945, shows a total revenue of £817,409 (against (£765,197) and expenses amounting to £587,448 (£529,482). As already announced the ordinary dividend for the year is maintained at 12½ per cent by a final payment of 7½ per cent. After transferring £116,583 from contingencies and other reserves no longer required, making provision for debenture and other interest, depreciation and dividends, and allocating £85,000 to general reserve (last year £5,000 to contingencies), the carry-forward is raised from £6,957 to £39,431.

The South Metropolitan Electric Light & Power Co., Ltd.,—After providing £75,000 (£80,000) for taxation, the net profit for 1945 was £38,750 (against £22,797 for 1944), and £19,117 (£25,000) is transferred from reserves no longer required. It is proposed to pay an unchanged dividend of 7 per cent, leaving £50,539 (£38,047) to be carried forward.

The Llanelly & District Electric Supply Co., Ltd., has declared a dividend of 6 per cent (same).

The Salisbury Electric Light & Supply Co., Ltd., with a final dividend of 6 per cent, is maintaining the year's distribution at 10 per cent.

The Globe Telegraph & Trust Co., Ltd., has announced a quarterly ordinary dividend of 1 per cent tax free (same).

J. & F. Stone Lighting & Radio, Ltd., have announced an interim dividend of 10 per cent; no interim payment was made last year.

New Companies

Berec Battery Export Co., Ltd.—Private company. Registered March 7th. Capital, £50,000. Objects: To carry on the business of electricians, electrical engineers, manufacturers of, and dealers in, electrical appliances, apparatus, novelties and specialities, mechanical engineers, producers and suppliers of electricity and power, dealers in batteries, dynamos and motors, etc. Directors: M. Goodfellow, "Ashmount," West Heath Road, Hampstead, N.W., and four others. Registered office: Hercules Place, Holloway, N.7.

Philco Radio & Television Corporation of Great Britain, Ltd.—Private company. Registered March 7th. Capital, £100. Objects: To carry on the business of merchants and wholesale and/or retail dealers in products and requirements of engineers; to act as agents; manufacturers of, and dealers in, electrical apparatus and all kinds of materials used in

radio, telecommunication, etc. Subscribers: A. R. Ward, 14, Gathorne Road, Wood Green, N.22, and H. G. Steele, 1, Fortismere Avenue, N.10. Registered office: Wadsworth Road, Perivale, Greenford, Middlesex.

Cable Strippers, Ltd.—Private company. Registered March 4th. Capital, £500. Objects: To carry on the business of electric cable strippers, electrical contractors and engineers, electricians, manufacturers of, and dealers in, electric and other cables, wire and other raw materials, for and from cables and apparatus for stripping and making cables, wireless apparatus, clocks, stoves, lamps, etc. Directors: H. H. Harvey, and Mrs. Constance R. Harvey, both of The Sibthorpe Arms, Welham Green, Hatfield, Herts. Registered office: Leighton House, Darkes Lane, Potters Bar, Middlesex.

Turnright Controls, Ltd.—Private company. Registered February 26th. Capital, £10,000. Objects: To carry on the business of designers and manufacturers of, and dealers in, electrical switches and accessories, electric light, cooking, heating and other electrical apparatus, etc. Directors: A. C. Swaffield, Colesgrove Farm, Goffs Oak, Herts, and H. S. Homerstone, 90, Cornwall Road, Ruislip. Registered office: Colesgrove Farm, Goffs Oak, Herts.

Milldale Electric Co., Ltd.—Private company. Registered February 27th. Capital, £300. Objects: To carry on the business of manufacturers and repairers of, and dealers in, dynamos, motors, armatures, magnetos, batteries, etc. Directors: A. Duncan, 8, Leamington Street, Rochdale, and two others. Registered office: 6, Cheetham Street, Rochdale.

Maldwyn Thomas, Ltd.—Private company. Registered February 28th. Capital, £2,000. Objects: To acquire the business of an electrical contractor now carried on by M. Thomas at 85, High Street, Merthyr Tydfil. Directors: M. Thomas and Ursula M. Thomas, both of 3, The Parade, Merthyr Tydfil. Registered office: 85, High Street, Merthyr Tydfil.

Nichols & Peed (Electricals), Ltd.—Private company. Registered February 28th. Capital, £2,000. Objects: To carry on the business of radio, television and electrical engineers, etc. Directors: R. F. Nichols, 95, Harecroft Road, Wisbech, and P. A. Peed, 43, North Brink, Wisbech. Registered office: 95, Harecroft Road, Wisbech.

Controlled Equipments, Ltd.—Private company. Registered March 4th. Capital, £1,000. Objects: To carry on the business of manufacturers and repairers of, and dealers in, dynamos, motors, armatures, batteries, transformers, electric and quartz lamps, bells, fires, cookers, control gear and electrical plant and supplies, motor cars, etc. Directors: C. E. Surman, and Mrs. Elsie A. Surman, both of 3, Fairway, New Barnet.

Van Colle Bros., Ltd.—Private company. Registered, March 12th. Capital, £1,000. Objects: To carry on the business of manufacturers, designers and repairers of, and hirers of, electrical and mechanical apparatus and accessories, etc. Subscribers: V. G. Van Colle, Strathmore, Overbrook Drive, Prestwich, and H. Van Colle, 9, Mayfields Close, Wembley Park, Middlesex. Registered office: 9, Mayfields Close, Wembley Park, Middlesex.

Increases of Capital

Page & Miles, Ltd.—The nominal capital has been increased by the addition of £5,000 in £1 7½ per cent second preference shares, beyond the registered capital of £1,500.

Ellesmere Port Electrical Co., Ltd.—The nominal capital has been increased by the addition of £1,500 in £1 shares, beyond the registered capital of £500.

Electrical Undertakings, Ltd.—The nominal capital has been increased by the addition of £4,500 in £1 ordinary shares, beyond the registered capital of £500.

Mortgages and Charges

Hirst, Ibbetson & Taylor, Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated February 18th, 1946, to secure £16,000, ranking *pari passu* with existing debentures for £7,000 and £7,000, but subject to mortgage of February 21st, 1934, and further charge of October 24th, 1938. Holders: Branch Nominees, Ltd.

J. & N. Wade (London), Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated February 21st, 1946, to secure £5,000, ranking *pari passu* with existing debentures for £1,500, £1,500 and £5,000. Holders: Branch Nominees, Ltd.

F. W. Langley, Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated February 2nd, 1946, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

Grimston Electric Tools, Ltd.—Particulars filed of £1,000 debentures authorised February 15th, 1946, charged on the company's undertaking and property, present and future, including uncalled capital, the whole amount being now issued.

Davies, Kent & Stewart, Ltd.—Satisfaction in full on February 26th, 1946, of series of debentures authorized July 26th, 1904, and registered September 15th, 1932, securing £1,350.

Correx Communications Equipment, Ltd.—Mortgage on moneys under contract, dated February 20th, 1946, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

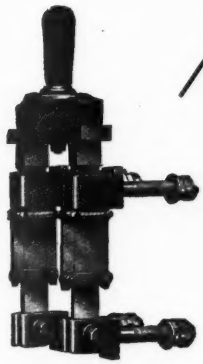
Bankruptcies

H. K. Hawkins, electrical engineer, lately residing at 48, Beaufort Road, Edgbaston.—Last day for receiving proofs for dividend April 1st, 1946. Trustee: Mr. R. K. Clark, Somerset House, 37, Temple Street, Birmingham, 2.

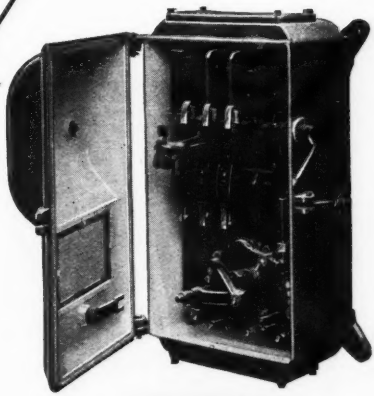
A further notice in the same issue of the *London Gazette* states that the receiving order dated April 13th, 1937, was rescinded and the order of adjudication dated May 21st, 1937, annulled on February 28th, 1946, the Court being satisfied that the costs of bankruptcy and debts have been or will be paid in full.

THE VERITY RANGE

MOTORS



SWITCHGEAR



STARTERS

VERITYS LTD. ASTON, BIRMINGHAM 6

Sales Headquarters : BRETTENHAM HOUSE, LANCASTER PLACE, W.C.2

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TRADE MARK

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FISCHER BEARINGS CO. LTD., WOLVERHAMPTON

Associated with British Timken Ltd.

STOCKS AND SHARES

STOCK Exchange markets lie under the influence of international politics. The menacing attitude adopted by Russia sufficed to shake prices severely, more particularly, of course, those of shares in which anything like a bull account existed. Dollar stocks gave way. The electricity supply group held its ground very well, and the price fluctuations on the week are insignificant. Investment is restricted by the caution engendered by the political outlook. Upon the latter becoming clearer, a fairly general recovery occurred in which markets participated. Tokyo sixes are 9½ down at 33½.

Fluctuations in Prices

British Government stocks suffered a sharp decline during the so-called Russian crisis without this affecting the gilt-edged Central Electricity Board and London Transport issues. Transport "C" fell a point to 57. Thomas Tilling remain dull at 52s. Brazilian Traction dropped 1 to 29¼, and International "Tel. & Tel," 1½ to 27, a loss of 6 points in less than a month. Oriental Telephones at 59s. went down 2s. 6d. Cable & Wireless followed the general trend, with falls to 111 in the preference and to 96 in the ordinary. Calcutta Electric Trams made a cheerful exception to the general dullness by rising 6s. to 68s. 6d. The price fell back to 66s., however, on a notification that the company is seeking an injunction to restrain the Calcutta Corporation from proceeding with arbitration in connection with its proposal to take over the Company's undertaking.

Equipment and Manufacturing

Rises of 1s., to 41s., in Siemens and of 6d., to 23s. 9d., in Switchgear & Cowans, demonstrate the readiness of buyers to take shares deemed to possess promising prospects. Disappointment with the British Aluminium dividend reduction had no effect upon the price, which remains at 39s. British Insulated Callenders are down 1s. at 46s., and Electric Constructions a similar amount at £3. Hopkinsons at 90s., and Murex at 95s., are both 1/8 lower. In the telephone group, Automatics at 68s. 6d. have lost 1s. 6d. Cossor fell from 42s. to 39s. 6d. on the strike, rallying later to 41s. Other changes are mostly correspondent to the easier tendency of markets.

Dividends Increased

British Light & Power has put up its dividend from 7 per cent to 10 per cent, and shares available at 32s. yield, at that price, 5 per cent, calculating the dividend as 8 per cent, the additional 2 per cent having been declared as a bonus. The London Associated dividend has gone up from 4 per cent to 6 per cent. and at 27s. ex dividend the return is £4 8s. 9d. Northmet Power ordinary received 9 per cent against 7 per cent in the corresponding period, and at 41s. 3d. this gives a return of £4 7s. 3d. Altrincham 5s. deferred shares can be bought at 15s. to pay as much as £5 13s. 3d. on the last declared dividend of 10¼d. per share.

Dividends Maintained

Two recent dividend announcements of importance to the market in electrical equipment shares are those of Ericsson Telephones and Lancashire Dynamo & Crypto. In both cases, the distribution is brought up to the total paid for the last few years. Ericsson's final dividend is 17 per cent, including 3 per cent bonus, making 20 per cent for the year, all the payments being tax free. The 5s. shares are on the easy side, at 53s. 9d. The yield works out to a little under 2 per cent net. According to the preliminary figures, net profits are a trifle lower than before.

With a final dividend of 10 per cent, and bonus of 7½ per cent, the year's distribution on Lancashire Dynamo is again 22½ per cent. Apparently the profit figure is virtually unchanged, as is the price of the shares at 5 9/16 allowing for deduction of the dividend. At this level, the yield is a shade over 4 per cent. The fresh capital raised last month qualifies for three-fifths of the present distribution.

Associated Electrical

Associated Electrical Industries at 61s. were unchanged by the company's announcement that the shareholders are to be offered new ordinary shares at 50s. per share, in the proportion of one new for every five old. The company's profit for 1945, at £542,817 is £75,000 up on the year. The report will be issued early next month.

J. & F. Stone

A company interested in the supply of radio sets, though not primarily concerned with their manufacture, is J. & F. Stone Lighting & Radio. It owns a long chain of shops retailing radio sets, and electrical lighting and heating equipment generally. The 5s. shares are at present an active market at 21s. The dividend for 1945 was raised from 6 to 15 per cent. For the current year an interim dividend of 10 per cent has just been declared.

Radio Rentals

The 5s. shares of Radio Rentals have been in steady demand for some time, and have lately improved to 33s. 6d. Dividends of 20 per cent have been paid annually for the past three years, and each has represented a conservative distribution of the profits available. The yield of barely 3 per cent implies the expectation that, with an increasing number of radio sets becoming available for hiring out under the company's service and maintenance system, there is scope for a higher dividend than that distributed during the period of wartime restrictions.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

A. ABBEY (Arenco Aktiebolag).—"Electrical device for synchronous transmission of movements." 2418. February 9th, 1944. (575703.)

Akt. Ges. Brown, Boveri & Cie.—"Contact clamps for electric cables and wires particularly of light metal." 14474/43. September 18th, 1942. (575682.)

Allmanna Svenska Elektriska Aktiebolaget.—"Leading-through insulators." Cognate applications 21094/44 and 21095/44. October 29th, 1943. (575759.)

Amalgamated Wireless (Australasia), Ltd.—"Voltage regulating circuits." 18605/43. February 3rd, 1943. (575684.)

C. A. Barron and H. D. Barron.—"Wire-drawing machines." 5962. March 31st, 1944. (575665.) "Wire-drawing machines." 5961. March 31st, 1944. (575713.)

G. Beauvais, J. S. Monys-Levy and R. S. Oppenheimer.—"Relay responsive to sound waves." Cognate applications 7393/40 and 7394/40. April 25th, 1939. (575731.)

British Thermostat Co., Ltd., and W. F. F. Martin-Hurst.—"Relay devices." 5878. March 30th, 1944. (575662.)

British Thomson-Houston Co., Ltd.—"Clothes washing machines." 20495/43. December 12th, 1942. (575625.) "Methods of preparing organosilicon halides." 13361/42. September 26th, 1941. (575667.) "Methods of preparing organosilicon halides." 13362/42. September 26th, 1941. (575668.) "Solid, porous contact masses for chemical reactions." 13363/42. September 26th, 1941. (575669.) "Methods of preparing tetrachloroethylene and chlorosilanes." 3057/43. March 4th, 1942. (575672.) "Preparation of organosilicon halides." 3059/43. March 4th, 1942. (575673.) "Preparation of organosilicon halides." 3137/43. March 4th, 1942. (575674.) "Treatment of materials to render them water repellent." 3138/43. March 4th, 1942. (575675.) "Discharge lamp systems." 6232/44. April 10th, 1943. (575744.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—"Treatment of materials to render them water repellent." 9320. May 15th, 1944. (575696.) "Electron discharge circuit." 2465. February 10th, 1944. (575704.)

British Thomson-Houston Co., Ltd., L. W. Brown and J. H. Nicoll.—"Adjustable impedance device for use in wave guides." 5939. March 30th, 1944. (575739.)

British Thomson-Houston Co., Ltd., T. F. Robinson, R. T. Coe and D. F. Welch.—"Electrical ignition apparatus for internal-combustion engines." 12809. September 10th, 1942. (Addition to 535238.) (575606.)

Brush Development Co.—"Electric recording and reproducing devices." 71/43. January 1st, 1942. (575671.)

Chance Bros., Ltd., W. M. Hampton and N. J. B. Raymond.—"Cathode ray bulbs." Cognate applications 6271/44 and 15267/44. April 4th, 1944. (575747.)

Cinch Manufacturing Corporation.—"Holders for thermionic valves and other electrical appliances." 21492/43. December 16th, 1942. (575627.)

E.M.B. Co., Ltd., and W. H. Cockerill.—"Injection moulding machines." 3760. February 29th, 1944. (575643.)

English Electric Co. of Canada, Ltd.—"Transformer tanks." 15968/44. June 27th, 1944. (575634.)

General Electric Co., Ltd., and E. Friedlander. "Polyphase self-starting electric synchronous motors." 11274. July 12th, 1943. (575681.)

B. M. Hadfield.—"Thermionic valve amplifiers." 20985. December 14th, 1943. (575639.

G. Hallam.—"Appliances for the holding of arc welding electrodes." 787. January 15th, 1944. (575700.)

Hobart Manufacturing Co.—"Slicing machines." 1817/45. August 22nd, 1942. (Divided out of 566511.) (575762.)

C. E. Hovey.—"Electrical selector for coin chutes in coin-handling and/or coin freed apparatus." 5641. April 8th, 1943. (575679.)

Jack & Heintz, Inc.—"Commutators for dynamo-electric machines." 3766/44. January 6th, 1943. (575708.)

Jentique, Ltd., and B. A. Smart.—"Synchronous electric clocks." 14561. September 6th, 1943. (575621.)

J. McDonald and G. W. B. Electric Furnaces, Ltd.—"Conveyor type heating furnaces." 5181. March 20th, 1944. (575710.)

E. P. Nye.—"Switch means for controlling a series of circuits for heating or other appliances having a series of heating or other electrical elements." 5436. March 23rd, 1944. (575654.)

J. F. O'Brien.—"End closure means for electric wiring units." 18308/43. November 26th, 1942. (575623.) "Locking means for electrical connectors." 18754/43. October 14th, 1942. (575686.)

W. Partington and Metropolitan-Vickers Electrical Co., Ltd.—"Dynamo electric machines and regulating arrangements therefor." 11392. June 14th, 1944. (575633.)

Pressed Steel Co., Ltd., and W. S. Simmie.—"Welding cables." 5860. March 30th, 1944. (575660.)

W. H. Riddle and Metropolitan-Vickers Electrical Co., Ltd.—"Electrodes for spot welding." 6193. April 3rd, 1944. (575742.)

A. J. W. Schiefelbusch.—"Fittings for electric lamps." 7411/40. April 24th, 1939. (575732.)

Standard Telephones & Cables, Ltd.—"Transformer." 6004/44. April 10th, 1943. (575719.)

W. H. Storey.—"Electric torches." 20537. December 8th, 1943. (575687.)

Walsall Conduits, Ltd., and E. Gough.—"Electric tumbler switches." 3147. February 21st, 1944. (575705.)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia.—May 2nd. Western Australian Government Tramways. Fifty 6-wheel trolley-bus chassis, fittings, etc.

Birmingham.—March 26th. Electric Supply Department. Single-phase and three-phase meters. (March 15th.)

Bromley.—April 10th. Electricity Department. Cables and transformers. (See this issue.)

Dagenham.—April 1st. Borough Council. Electrical wiring at 108 houses and 10 bungalows at Thornton Farm estate. (March 8th.)

Edinburgh.—April 2nd. Corporation. 33-kV reactors for Portobello power station. Forms, etc., from Corporation consulting engineers, Kennedy & Donkin, Alliance House, 12, Caxton Street, Westminster, S.W.1.

Egypt.—Ministry of Works. Supply, delivery, erection and maintenance of hydro-electric generating plant at Aswan. Specifications (£E100 for two copies) may be obtained from Kennedy & Donkin, consulting engineers, 12, Caxton Street, London, S.W.1.

Eire.—May 1st. Electricity Supply Board. Steam station, Portarlington. Forms of tender from P. J. Dempsey, clerk and secretary, Electricity Supply Board, 60-62, Upper Mount Street, Dublin.

Fleetwood. — March 30th. Corporation. Cables for twelve months. (See this issue.)

Grimsby.—March 28th. Electricity Department. Substation transformers, switchgear and cables. (March 15th.)

Kesteven.—April 5th. County Council. Electrical installations at the Public Assistance Institution, Grantham. (March 15th.)

Littleborough (Lancs).—March 30th. Electricity Department. Substation equipment comprising one 500-kVA three-phase transformer, e.h.v. and l.v. switchgear. (March 15th.)

Llandrindod Wells.—March 29th. Electricity Department. E.h.v. and l.v. cable. (March 15th.)

Manchester.—April 5th. Electricity Department. Cables and service cut-outs for twelve months. (See this issue.)

North of Scotland.—April 1st. Hydro-Electric Board. Weir, fish ladder, tunnels, and power station on the River Morar, Inverness-shire. Plans, etc., from I. and A. Leslie & Reid, 72A, George Street, Edinburgh.

April 5th. H.v. and l.v. overhead lines in the Isle of Skye. (March 15th.)

Norwich.—March 28th. Electricity Department. Electric cookers, water heaters, refrigerators, wash-boilers, kettles, irons and vacuum cleaners for twelve months. (March 15th.)

Rhondda.—March 30th. Electricity Department. Three 200-kVA and four 300-kVA three-phase transformers. (March 15th.)

Weymouth.—April 16th. Electricity Department. Overhead lines and underground cable, pole-mounting switchgear, transformers and l.v. overhead lines. (March 15th.)

Orders Placed

Auchtermuchty (Fife).—Town Council. Accepted. Electrical work at housing scheme (£840).—J. Ferrans & Sons.

Birmingham.—Electric Supply Committee. Accepted from November 17th, 1945 to February 28th. Electric kettles, Premier Electric Heaters and Mayall & Co.; aluminium saucepans, Hague & McKenzie, and Bulpitt & Sons; cookers, Simplex Electric Co., Revo Electric Co., G.E.C., and Jackson Electric Stove Co.; cooker control units, J. A. Crabtree & Co., and Arrow Electric Switches; water heaters and control panels, Santon; wash-boilers, Burco; distribution transformers, Bonar, Long & Co.

Cardiff.—Electricity Committee. Accepted. New bushes for feeder switches (£422 plus erection costs).—B.T.H. Co. Grate chain parts (£503).—Babcock & Wilcox. 33,000-V cable (£1,980 per 1,000 yd and pilot cable £108 per 1,000 yd). — Pirelli-General Cable Works. 7,500-kVA transformer (£5,552). — English Electric Co. Switchboard extension (£4,438).—Metropolitan-Vickers.

Hove.—Electricity Committee. Accepted. Conversion of six passenger lifts from D.C. to A.C. (£1,587).—Waygood Otis.

Newcastle-on-Tyne.—City Council. Accepted. 3,000-kVA auto-transformer for the Manors power station (£624).—C. A. Parsons & Co. Supervisory equipment for the Vine Lane substation (£872).—Standard Telephones. Mercury arc rectifier equipment for the Gosforth substation (£4,525).—Hewittic Electric Co.

St. Pancras.—Contracts Committee. Accepted. 144 auto-control electric irons, 60 2-kW electric fires and 40 1-kW fires (£370).—Morphy Richards. 25 "Model T.6" electric refrigerators (£1,887 including installation and maintenance for one year).—Brett Daniels. Six "Model C" cabinet washing machines (£240) and 50 chrome-plated 3-pint kettles (£128).—Hotpoint Electric Appliance Co. 24 "Major" washing machines (£311).—Universal Boilers & Engineering Co.

Sheffield. — Water Committee. Accepted. Metering equipment (£2,356). — Electroflo Meters Co.

Electricity Committee. Accepted. Switchgear modification at Neepsend power station (£5,179 for material and about £2,000 for erection).—A. Reyrolle & Co. Two 660-kVA transformers (£730).—Electric Construction Co.

Swindon. — Library Committee. Recommended. Stage lighting and switchboard at the library (£500).—Strand Electric & Engineering Co.

Wolverhampton.—Town Council. Accepted. Lighting standards for Willenhall Road and Bushbury estates (£9,800).—Revo Electric Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Amble (Northumberland).—Houses (48), for U.D.C.; Hetherington & Wilson, County Chambers, Newcastle-on-Tyne.

Amblecote.—Houses (34), Vicarage Road and Corbett Crescent (£35,795); A. J. Crump & Sons, Ltd., builders, Aston Road, Dudley.

Arundel.—Houses (38), Green Lane; G. A. Gates, borough surveyor, Council Offices.

Ashgate.—Hospital; Chesterfield and North Derbyshire Hospital Board.

Ashington.—Library for the U.D.C.; B. Preston, surveyor.

Aspatria.—Factory for Larma, Ltd.; Taylor Brothers, builders, Littleborough, Lancashire.

Boldon.—Houses (50), Whitburn (£54,015); Tate & Holmes, Ltd., builders, Benwell.

Cambridgeshire.—Proposed hospital, Chesterton; county architect, Shire Hall, Cambridge.

Cardiff.—Houses (42), on three sites (£47,925); N. G. Nurton, Ltd., builders, 46, Stuart Street Docks.

Carlisle.—Houses (276), five estates; city engineer.

Works extensions, Denton Street; Pratchitt Bros., Ltd.

Chesham.—Houses (36), Missenden Road and Bellingdon Road; L. C. Powell, architect, Norfolk House.

Chippenham.—Houses (30), Derriads (£39,750); E. H. Bradley & Sons, builders, Swindon.

Conisborough.—Houses (30), for U.D.C.; B. Bailey, builder, "Wynbourne," Doncaster Road, Mexborough.

Corby.—Houses (102), Forest Gate site; Blackwell & Storry, architects, Gold Street, Kettering.

Deal.—Houses (134), Park Road; D. A. Daniels, town clerk, Municipal Offices, 39, Queen Street.

Dudley.—Handicraft and biology rooms at Training College (£6,600); C. M. Coombs, county architect, County Buildings, Stafford.

Durham.—Cinema, Neville's Cross; Thompson's Enterprises, Ltd., Palladium Buildings, Linthorpe, Middlesbrough.

Esher.—Houses (36), Littleheath Farm, Oxshott; F. Evans, clerk, Council Offices.

Gateshead-on-Tyne.—Factory additions, Abbot Street, for R. C. Kelly, Ltd.; J. Milne & Sons, Coatswood Road.

Gloucestershire.—School at Stow-on-the-Wold (£34,650); county architect, Shire Hall, Gloucester.

Halesowen.—Houses (46), on three sites; A. T. & B. Butler, architects, 31, Priory Street, Dudley.

Haslingden.—Permanent houses (44), Broadway estate; R. Taylor, borough engineer, Municipal Offices, Bury Road.

Hebburn.—Houses (210), on the Campbell Park site for U.D.C.; Page, Son & Hill, architects, 75, King Street, South Shields.

Hemel Hempstead.—Permanent houses (30), Kings Langley and Markyate; B. Ll. Stephenson, surveyor, 2, Marlowes.

Hemsworth.—Houses (38), for the R.D.C.; Pearson & Blackwell, Ltd., builders, Doncaster.

Hoyland Nether.—Houses (62), Market Street; D. E. Chadwick, estates surveyor, 53-55, King Street.

Jarrow.—Factory, Bede estate, for Back & Cohen, Ltd.; North-Eastern Trading Estates, Ltd., Gateshead.

Kent.—Extensions, County Hospital, Chatham (£25,800); county architect, Maidstone.

Lanarkshire.—New block at Birkwood Institution (electrical and heating installations); W. C. Brownlie, clerk and treasurer, Lanarkshire House, 191, Ingram Street, Glasgow.

Lichfield.—Houses (100), Stowe estate (£120,126); J. R. Deacon, Ltd.

Littleborough.—Houses (32), at Shore for U.D.C. (£41,714); E. Taylor & Co., Ltd., Ebor Saw Mills.

Liverpool.—Kitchen and canteen, Alsop High School for Boys, Queen's Drive (£4,477); H. Boot & Son, Ltd., builders, Church Road, Litherland.

Medomsley (Co. Durham).—Kitchen and scullery, Medomsley Edge school; R. C. Williamson, Rowlands Gill.

Middlesbrough.—Houses (35), Falcon Road; R. H. Bailey & Son, Ltd., builders, Denmark Street.

Bus depot extensions, including electric lighting and power installations, Parliament Road; borough engineer, Town Hall.

Factory additions, for Middlesbrough Casements, Ltd.; Kitching & Co., architects, 40, Albert Road.

Morpeth.—Permanent houses (161), Widdrington Station and Lynemouth; J. B. Annett, clerk, 15, Bridge Street.

Newbiggin (Northumberland).—Houses (108); J. Kailofer, U.D.C. surveyor.

Newcastle-on-Tyne.—Factory extensions, Benton Road, for A. S. Wilkin, Ltd.; C. S. Errington, architect, 46, Grainger Street.

Newport (I. o. W.).—Houses (20), council estate (£22,742); Jukes & Son, Ltd., and Batty & Smith, Ltd.

Rochford.—Houses (28), Coronation Close, Great Wakering; A. N. Cox, surveyor, R.D.C. Offices.

Shifnal.—Permanent houses (36), Curriers Lane; J. Brian Cooper, architect, 177, Corporation Street, Birmingham, 4.

Southall.—Houses (36), Holly Cottage site, North Hyde; borough surveyor, Town Hall.

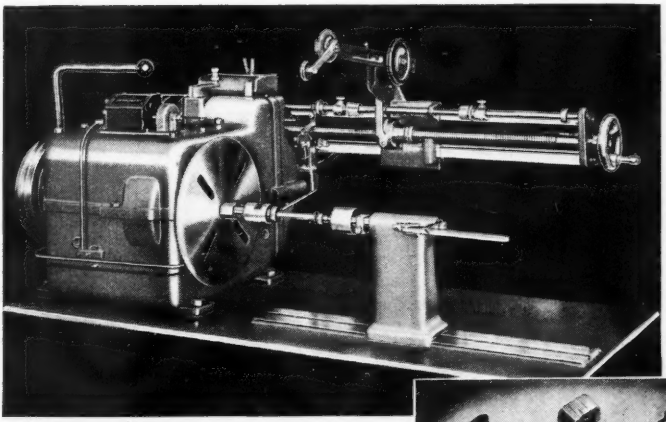
South Shields.—Canteen and kitchen, Harton County primary school; borough engineer.

Sunderland.—Houses (35), Seaforth Road estate; C. T. Elliott, builder, Ettrick Grove.

Uttoxeter.—Houses (44), Weaver Lodge estate (£49,566); G. Percy Trentham, Ltd., builders, Wood Lane, Erdington, Birmingham.

Watford (Herts).—Permanent houses (22), Willow Way, Radlett; S. A. Nicholson, clerk to the Council, Council Offices.

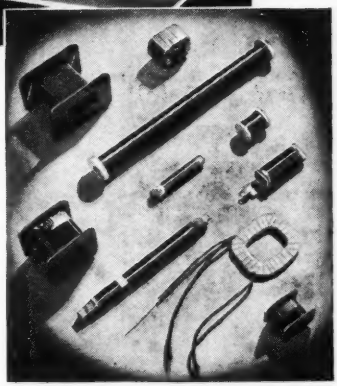
Coil winding MACHINES



TYPE MW MACHINE

Suitable for 11 to 47 S.W.G.

Wire gauges from 11 to 47 S.W.G. can be wound on the Neville's Type MW automatic coil winder. Such a wide range of coils would normally require three different sizes of machine. The very complete specification includes a pre-determined re-set revolution counter registering up to six figures, three speed geared drive, and ball bearings throughout. Coils of 12" maximum diameter from $\frac{1}{16}$" to 10" in length are within its capacity, and face-plate speeds from 283 to 1435 R.P.M. are obtainable. An experienced staff of highly skilled technicians is always prepared to give individual attention to coil winding problems. Your enquiries are invited.

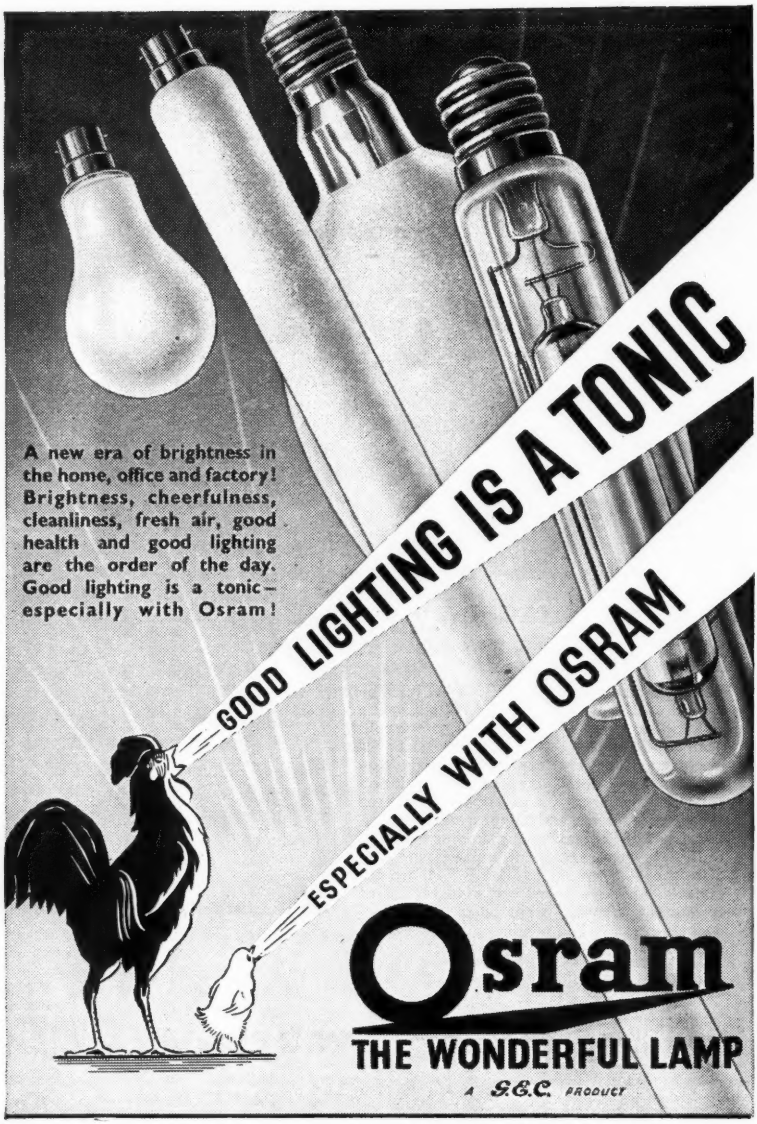


A representative group of coils wound on the Type MW machine.

NEVILLE'S (LIVERPOOL) LTD

THE SIMMONDS TOWER · GREAT WEST ROAD · LONDON

A COMPANY OF THE SIMMONDS GROUP


A new era of brightness in the home, office and factory! Brightness, cheerfulness, cleanliness, fresh air, good health and good lighting are the order of the day. Good lighting is a tonic—especially with Osram!
GOOD LIGHTING IS A TONIC
ESPECIALLY WITH OSRAM
Osram
THE WONDERFUL LAMP
A G.E.C. PRODUCT

Advt. of The General Electric Co. Ltd , Magnet House, Kingsway, London, W.C.2

CLASSIFIED ADVERTISEMENTS

ADVERTISEMENTS for insertion in the following Friday's issue are accepted up to **First Post on Monday,** at Dorset House, Stamford Street, London, S.E.1.

THE CHARGE for advertisements in this section is 2/- per line (approx. 7 words) per insertion; ***ONLY OFFICIAL AND GOVERNMENT ANNOUNCEMENTS CAN NOW BE DISPLAYED***:—30/- per inch. Where the advertisement includes a Box Number this counts as six words and there is an additional charge of 6d. for postage of replies.

SITUATIONS WANTED.—Three insertions under this heading can be obtained for the price of two if ordered and prepaid with the first insertion.

REPLIES TO advertisements published under a Box Number if not to be delivered to any particular firm or individual should be accompanied by instructions to this effect, addressed to the Manager of the ELECTRICAL REVIEW. Letters of applicants in such cases cannot be returned to them. The name of an advertiser using a Box Number will not be disclosed. All replies to Box Numbers should be addressed to the Box Number in the advertisement, c/o ELECTRICAL REVIEW, Dorset House, Stamford Street, London, S.E.1. Cheques and Postal Orders should be made payable to ELECTRICAL REVIEW LTD. and crossed.

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS, ETC.

BOROUGH OF BROMLEY ELECTRICITY DEPT.

TENDERS are invited for the supply and delivery of the undermentioned materials:—

ED6/1—Low Tension Cable, P.I.L.C. & S.T.A., 660 v.
ED6/2—Extra High Tension Cable, P.I.L.C. & S.S.W.A. 3,300 volts, 11,000 volts, and Low Tension Pilot Cable, P.I.L.C. & S.T.A., 660 volt.
ED6/3—1 3,000-kVA. 10,000/3,150-volt and 3 500-kVA. 10,000/400/230-volt, 3-phase Static Transformers.

Specifications and forms of tender may be obtained upon application in writing to W. G. Trend, Esq., A.M.I.E.E., Borough Electrical Engineer, 1, West Street, Bromley, Kent, upon payment of £1 each, which will be refunded upon receipt of a bona fide tender, not afterwards withdrawn. Additional copies 5s. (not returnable).

Tenders, sealed and endorsed "ED6/1—Low Tension Cables," "ED6/2—Extra High Tension Cables," "ED6/3—Three-phase Static Transformers," in plain envelopes, to be delivered to me not later than 12 o'clock noon on the 10th April, 1946. The Council does not bind itself to accept the lowest or any tender.

S. CRITCHLEY AUTY,
Town Clerk.

Municipal Offices,
Bromley, Kent. 112

BRITISH ELECTRICAL DEVELOPMENT ASSOCIATION

Supply of House Service Units

THE Council of the British Electrical Development Association has recently approved a design for an E.D.A. Standard Service Unit and, on request, will be pleased to provide a copy of the specification and full details to interested manufacturers to enable them to submit, through the Association, tenders for supplies of the unit direct to Electricity Supply Undertakings over a twelve months period.

Applications for specification, drawings, forms of tender, etc., should be addressed to: The General Manager and Secretary, British Electrical Development Association, 2, Savoy Hill, London, W.C.2. 4990

CITY OF MANCHESTER ELECTRICITY DEPT.

THE Electricity Committee invites tenders for the supply and delivery during a period of twelve months of the Department's requirements of Cables (Specification No. 851) and Service Cut-outs (Specification No. 850).

Specifications and forms of tender may be obtained from Mr. R. A. S. Thwaites, Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2, on payment of a fee of one guinea for each specification, which amount will be refunded on receipt of a bona fide tender. Tenders, addressed to the Chairman of the Electricity Committee, to be delivered not later than ten o'clock a.m. on Friday, 5th April, 1946.

PHILIP B. DINGLE,
Town Clerk.

Town Hall, Manchester, 2.
13th March, 1946. 4982

BOROUGH OF FLEETWOOD

THE Fleetwood Corporation invite tenders for the supply and delivery of Paper-insulated Cables for the 12 months ending March 31st, 1947.

Specifications, etc., from Mr. W. P. Lilwall, A.M.I.E.E., Borough Electrical Engineer, Electricity Works, Copse Road, Fleetwood. Tenders, endorsed "Tenders for Cables," to be delivered to the undersigned by 10 a.m. on 30th March, 1946.

ALAN SMITH, Town Clerk.

Town Hall, Fleetwood. 4942

SITUATIONS VACANT

BOROUGH OF TORQUAY ELECTRICITY UNDERTAKING

APPLICATIONS are invited for the following appointments in the Undertaking's Class A (Polyphase) Meter Testing Station at Newton Abbot:—

(a) METER TESTER (Class 1).
(b) CLOCK REPAIRER (Mechanician).

Applicants must be fully qualified men, possessing practical experience and a sound theoretical knowledge of the work involved. Preference will be given to those already accustomed to the testing, repair and maintenance of polyphase meters, maximum demand indicators, prepayment meters and clock mechanism in a well-equipped Class A Meter Testing Station.

Remuneration will in each case be in accordance with the D.J.I.C. scale of wages and conditions applicable to a Meter Tester (Class 1) for Devon and Cornwall Area (Zone B), which is at present 26.0d. per hour for a normal working week of 47 hours.

Successful applicants will be required to pass a medical examination and to contribute to the Corporation's Superannuation Scheme. Applications, in candidate's own handwriting, stating age, details of experience, when duties could be commenced, and accompanied by copies of not more than three testimonials, should be endorsed "Meter Reader" or "Clock Repairer Mechanician," as the case may be, and addressed to the Borough Electrical Engineer and Manager, Electric House, Union Street, Torquay, so as to be received not later than the 13th April, 1946.

H. A. HIELD, Town Clerk.

Town Hall, Torquay. 4967

BOROUGH OF LEIGH ELECTRICITY DEPT.

Appointment of Draughtsman

APPLICATIONS are invited for the position of Draughtsman in the above Department. The salary will be at the rate of £275 per annum, plus bonus (at present £59 16s. per annum).

Applicants must be capable of designing substations and buildings, and have a sound knowledge of modern drawing office practice and general mains records. The appointment, which will be subject to the provisions of the Local Government Superannuation Act, 1937, and to the selected candidate passing satisfactorily a medical examination to be conducted by the Council's Medical Officer of Health, will be determinable by one month's notice on either side.

Applications, endorsed "Draughtsman," stating age, and containing particulars of education, qualifications and experience, accompanied by copies of not more than three recent testimonials, must be delivered to the Borough Electrical Engineer, Electricity Offices, Bradshawgate, Leigh, Lancs., not later than 2nd April, 1946.

ALBERT JONES, Town Clerk.

Town Hall, Leigh. 103

CITY OF SALISBURY (SOUTHERN RHODESIA) ELECTRICITY DEPARTMENT

Vacancy for Meter Tester Mechanic

APPLICATIONS endorsed on the cover as above are hereby invited, and will be received by the undersigned up to 16th April, 1946, from duly qualified persons for the postion of Meter Tester Mechanic.

The successful applicant will be required to have not less than two years' experience as a meter tester, and must be capable of testing and repairing three-phase kilowatt-hour meters. Preference will be given to an applicant with experience of kVA maximum demand metering equipment of all types, and he will be required to assist with all work allocated to the Test Department. The commencing rate will be 4s. per hour for a 48-hour week, and overtime will be paid at the rate of time and a half. The Council's cost of living rates will be paid if applicable. Travelling expenses will be paid to successful applicant, subject to a proportionate refund in the event of resignation under three years, as follows: Person appointed and wife £50 each; children under sixteen years, first child £20, remainder £10 each.

Applicants are required to state their age, place of birth, nationality, whether married or single, give full particulars of qualifications and experience, and present occupation, furnish copies or not more than three recent testimonials, and state the earliest date on which duties can be commenced. In regard to any point not touched on in this advertisement the successful candidate will be bound by the Council's Service and Leave Regulations, and by any such amendments as may be made thereto from time to time, and will be required to furnish a satisfactory medical certificate of fitness. Canvassing directly or indirectly will disqualify applicants.

DAVIS SOPER LTD.
54, St. Mary Axe, London, E.C.3. Agents of the Salisbury (Southern Rhodesia) Municipality.
14th March, 1946.
111

BOROUGH OF DOUGLAS ELECTRICITY DEPT.

Chief Assistant Engineer

APPLICATIONS are invited for the position of Chief Assistant Engineer from Chartered Engineers who have had experience with an Electricity Supply Undertaking in generation by means of water tube boilers and turbo-alternators, and in distribution, including automatic rectifier substations, and the change over of supply networks from D.C. to A.C. Applicants must not be over 45 years of age.

The salary will be in accordance with N.J.B. Schedule, at present Class E, Grade 2 (less 7½%), commencing at £574 per annum.

The appointment will be an established post under the Superannuation Scheme of the Corporation, and the successful applicant will be required to pass a medical examination and to contribute to the Council's Superannuation Fund. The Council's Superannuation Scheme does not provide for receipt or payment of any transfer value on entering or leaving the Council's service. A suitable interval will be allowed in order to permit applications to be received from those serving in His Majesty's Forces.

Applications, endorsed "Chief Assistant Engineer," giving particulars of age, qualifications and experience, together with copies of not more than three recent testimonials, should be addressed to the Borough Electrical Engineer and Manager, Electricity Offices, Douglas, not later than April 20th, 1946.

PERCY M. SHIMMIN,
Town Hall, Douglas, Isle of Man. Town Clerk.
12th March, 1946.
108

SCOTTISH SOUTHERN ELECTRIC SUPPLY CO. LTD.

Meter Repairer (Mechanician)

APPLICATIONS are invited for the position of Meter Mechanician in a Class A Polyphase Testing Station. Applicants must have experience of repairing A.C. Meters, Prepayment Mechanisms, Time Switches and Maximum Demand Indicators.

Wages and conditions in accordance with Joint Industrial Council, Electricity Supply Industry, Scottish District No. 13. Applications, giving age and experience, to be addressed to:

W. S. SAWTELL, M.I.E.E.,
High Street, Galashiels. General Manager.
4956

CITY OF PORTSMOUTH ELECTRICITY SERVICE

APPLICATIONS are invited for the following positions:

(a) TECHNICAL ASSISTANT (ELECTRICAL) at a salary in accordance with Grade 7, Class J, of the N.J.B. Schedule, at present £509 per annum. Applicants must have had a sound technical training and experience in modern generation and distribution of electricity, and must be in possession of technical qualifications admitting to corporate membership of the Institution of Electrical Engineers.

(b) DEVELOPMENT ENGINEER (DISTRIBUTION) at a salary in accordance with Grade 7, Class J, of the N.J.B. Schedule, at present £509 per annum. Applicants must have had a sound technical training and practical experience in the installation of E.H.T. and L.T. underground cables, overhead lines and substations, be able to undertake the work of planning and estimating distribution extensions, and be in possession of technical qualifications admitting to corporate membership of the Institution of Electrical Engineers.

(c) APPARATUS WORKSHOP AND TRANSPORT SUPERINTENDENT at a salary in accordance with Grade 7, Class J, of the N.J.B. Schedule for the Electricity Supply Industry, at present £509 per annum. Applicants should have had a sound technical education in electrical and mechanical engineering, experience of modern methods of works organization and control of labour, experience in the repair and efficient operation of motor vehicles, and preferably be in possession of technical qualifications admitting to corporate membership of the Institution of Electrical Engineers or the Institution of Automobile Engineers.

(d) TWO DISTRICT DISTRIBUTION ENGINEERS at a salary in accordance with Class J, Grade 8, of the N.J.B. Schedule, at present £469 per annum. Applicants must have had a sound technical training and practical experience in the installation, operation and maintenance of E.H.T. and L.T. underground and overhead distribution systems, and preferably be in possession of qualifications admitting to corporate membership of the Institution of Electrical Engineers

Forms of application may be obtained from the Engineer and Manager. The latest date for the return of applications is 2nd April, 1946. Canvassing, either directly or indirectly, will be a disqualification.

R. H. COATES,
111, High St., Portsmouth. Engineer and Manager.
18th March, 1946. 4963

COUNTY BOROUGH OF NEWPORT ELECTRICITY DEPARTMENT

Appointment of Stoker

APPLICATIONS are invited from suitably qualified persons not over 40 years of age for the above position. Applicants must have had experience in the control of boilers with chain grate stokers, together with feed pumps and auxiliary plant. The boiler operating pressures are 625 lbs. per square inch and 275 lbs. per square inch, and preference will be given to men who have operated boilers working at similar pressures. Naval men shortly leaving the Service will be considered, and they should give their demobilisation dates.

Conditions of service and pay will be in accordance with the South Wales and Monmouthshire District (No. 4) Joint Industrial Council (Electricity Supply) Schedule for Shift Workers, the rate of pay at present being 2s. 3d. per hour for a 48-hour week.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination. Applications, stating age, qualifications and experience, together with copies of testimonials, should be forwarded to the undersigned not later than Saturday, 6th April, 1946.

T. H. WOOD, M.I.Mech.E., A.M.I.E.E.,
Electric House, 191-2, Dock St., Newport, Mon. Borough Electrical Engineer and Manager.
4989

BOROUGH OF MARLBOROUGH ELECTRICITY DEPT

APPLICATIONS are invited for the position of Plumber Cable Jointer. Applicants should be experienced on all systems up to 11 kV, and preference will be given to candidate with knowledge of installation work. Wages in accordance with the N.J.I.C. (No. 6 Area) Schedule, at present 25.89d. per hour. A prefabricated bungalow will be available for the successful applicant. Applications, stating age and details of experience, should be accompanied by copies of recent testimonials and addressed to the Borough Electrical Engineer, 48, Kingsbury Street, Marlborough.
4961

SPENBOROUGH URBAN DISTRICT COUNCIL

Appointment of Electrical Engineer and Manager

APPLICATIONS are invited for the position of Electrical Engineer and Manager at a salary in accordance with the scale set out in the Agreement made by the National Joint Committee of Local Authorities and Chief Electrical Engineers, dated 9th July, 1941, and full scale salary, estimated to be £797 this year, will be paid to a suitable candidate. A car allowance, at present £70 per annum, will be paid in respect of a suitable car provided by the person appointed.

Applicants must be fully conversant with the management and control of an Electricity Undertaking, and preference will be given to those who are Members or Associate Members of the Institution of Electrical Engineers. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the person appointed will be required to pass a medical examination.

Applications, stating age, qualifications, details of experience, present appointment, notice required to terminate present appointment, and accompanied by copies of not more than three recent testimonials, to be sent to the undersigned not later than 1st April, 1946, endorsed "Electrical Engineer and Manager." Applications received in response to the earlier advertisement will receive due consideration. Canvassing, either directly or indirectly, will be a disqualification.

D. COUPE,
Clerk of the Council.

Town Hall, Cleckheaton.
March, 1946. 120

BOROUGH OF ROYAL TUNBRIDGE WELLS

Appointment of Deputy Borough Electrical Engineer

APPLICATIONS are invited from suitably qualified and experienced candidates over 30 years of age for the post of DEPUTY BOROUGH ELECTRICAL ENGINEER at a salary of £700 per annum (plus war bonus), rising by two increments of £25 p.a. to £750 p.a., such increments being payable for the third and fourth years of the service respectively.

Preference will be given to those candidates who possess an Engineering degree or its equivalent and/or are Corporate Members of the Institution of Electrical Engineers. Extensive experience with a modern progressive Undertaking with sales development and commercial experience is also essential. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination and reside within the Borough. Members of H.M. Forces who have the necessary qualifications are invited to apply for the appointment. Applications, stating age, details of training and experience, and the names and addresses of three persons to whom reference may be made as to the candidate's qualifications, must be received by the undersigned not later than Saturday, April 6th, 1946.

JOHN WHITEHEAD,
Town Clerk.

Town Hall,
Tunbridge Wells.
6th February, 1946. 126

BOROUGH OF BASINGSTOKE ELECTRICITY DEPT.

Lady Demonstrator-Showroom Attendant

APPLICATIONS are invited for the above appointment. Applicants must have a thorough training and experience in the demonstration of domestic electrical apparatus and general showroom duties.

The salary will be at the rate of £180 per annum, plus temporary war bonus (at present £48 2s.), rising, subject to satisfactory service, by annual increments of £10 to £200 per annum.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the conditions of the Council's Sick Pay Scheme. The successful candidate will be required to pass satisfactorily a medical examination by the Council's Medical Officer. Applications, endorsed "Lady Demonstrator," stating age, full particulars of qualifications, training, education and experience, and accompanied by copies of not more than three recent testimonials, should be forwarded so as to reach the undersigned not later than the 30th March, 1946. Canvassing, either directly or indirectly, will be a disqualification.

MEIRION O. JONES,
Town Clerk.

Municipal Buildings,
Basingstoke.
13th March, 1946. 4970

ELECTRICAL POWER ENGINEERS' ASSOCIATION

Vacancy for an Assistant Secretary

THE National Executive Council invites applications for the appointment of an ASSISTANT SECRETARY on the official staff of the Association, the location to be in the provinces to cover the south of England area. Applicants should have had experience in the Electricity Supply Industry, preferably on the technical side. The successful applicant will be responsible for secretarial duties at Association Committee meetings, negotiations with employing authorities, and presentation of claims at the District and National Joint Boards for the Electricity Supply Industry.

Salary Scale (basic £350, rising to £500) subject to the operation of Clause 33 of the N.J.B. Agreement; present commencing salary £411.

The successful applicant will be required to pass a medical examination and to contribute to the Association's Staff Pension Scheme. Applications in writing giving particulars of age, general and technical education, training, experience and qualifications, and endorsed "Assistant Secretary," should be addressed to the General Secretary, Electrical Power Engineers' Association, 102, St. George's Square, London, S.W.1, and should be received not later than Saturday, 6th April, 1946. 116

COUNTY BOROUGH OF ST. HELENS ELECTRICITY DEPARTMENT

Appointment of Draughtsman

APPLICATIONS are invited for the above position with salary and conditions in accordance with Grade 9, Class G of the National Joint Board's Schedule at present £340 per annum.

Candidates must possess a sound technical education and have practical experience in Steam Power Station Layout, Building Construction and Structural Engineering. A knowledge of Electricity Mains Records and Surveying will be an additional recommendation. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination. Applications, accompanied by copies of not more than three testimonials, must be made on the form obtainable from the address given below and be received not later than first post, 1st April, 1946, endorsed "Draughtsman."

P. BREGAZZI,
Electricity Engineer and Manager.

Electricity Works,
Carlton Street,
St. Helens, Lancs. 117

MIRFIELD U.D.C. ELECTRICITY DEPARTMENT

Cable Jointer (Plumber)

APPLICATIONS are invited for the above appointment. Applicants must have had experience in High Tension and Low Tension Jointing, Feeder Pillars, Link Boxes, and Substation E.H.T. and L.T. Switchgear.

Conditions of service and rate of pay will be generally in accordance with the D.J.I.C. Schedule (No. 2 Area), Section B.

The successful candidate will be required to pass a medical examination and contribute to the Council's superannuation scheme. Applications stating age, experience and present appointment and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than Monday, April 1st, 1946.

T. GERRARD,
Electrical Engineer and Manager.

Electricity Offices
Fold Head,
Mirfield, Yorks. 4995

METROPOLITAN BOROUGH OF BETHNAL GREEN ELECTRICITY DEPARTMENT

THE Council invites applications for the position of Electrical Fitter for maintenance and constructional work in Transformer Substations.

The appointment will be temporary in the first instance with a view, if satisfactory, to permanency. Wages will be in accordance with E.S.I. No. 10, at present 2s. 7d. per hour, inclusive of cost of living bonus (£6 1s. 5d. per 47-hour week).

Applications on the prescribed form, obtainable from E. E. Jolly, Esq., M.I.E.E., A.M.I.Mech.E., Borough Electrical Engineer and Manager, Town Hall, Bethnal Green, E.2, must reach him not later than 5th April, 1946.

S. P. FERDINANDO, Town Clerk. 109

ELECTRICITY SUPPLY BOARD, EIRE

Vacancies for Electrical Engineers

THE Electricity Supply Board invites applications for two positions on its engineering staff:

(a) Technical Divisional Engineer, Rural Electrification.

(b) Development Divisional Engineer, Rural Electrification.

Candidates must have a University Degree in Electrical Engineering or its equivalent. For (a) experience in the design and construction of high tension and low tension overhead networks, and for (b) experience in the development of electricity sales generally or particularly in the application of electricity to agriculture is desirable.

Each position carries a salary scale, £600 × £20 to £800 per annum and in addition, the prevailing emergency bonus.

The appointments will be on probation for a period of six months and the starting salaries in the scale will depend on the qualifications and experience of the successful candidates. Candidates appointed will be required to pass a medical examination. Applications stating age, qualifications and experience should reach the undersigned not later than the 6th April, 1946.

PATRICK J. DEMPSEY,
Secretary.

Electricity Supply Board,
60-62, Upper Mount St., Dublin. 4999

BOROUGH OF RADCLIFFE ELECTRICITY DEPT.

Cable Jointer (Plumber)

APPLICATIONS are invited for the position of Cable Jointer in the above Department. Wages and working conditions in accordance with the Schedule of the District Council, No. 3, North-Western Area, Electricity Supply Industry, Zone A. Present rate 27.45d. per hour for a 47-hour week.

Applicants must have experience in high and low tension mains jointing, feeder pillar, network boxes and substation H.T. and L.T. boards. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and to a satisfactory medical examination. Applications, stating age and experience, and accompanied by copies of not more than three recent testimonials, endorsed "Jointer," should reach the undersigned not later than Wednesday, April 3rd, 1946.

H. A. FOX,
Town Clerk.

Town Hall,
Radcliffe, Manchester.
March, 1946. 4993

CITY OF COVENTRY ELECTRICITY DEPT.

Overhead Linesmen

APPLICATIONS are invited from Overhead Linesmen who have had experience in the maintenance and repair of 66-kV lines on steel towers and the erection and maintenance of E.H.T. and L.T. overhead lines on wooden poles.

Rate of pay, 2s. 5.28d. per hour, plus special war bonus. There is also a long service bonus scheme in operation, whereby employees receive 3s. per week bonus for every 5 years' service, up to a maximum of 12s. per week after 20 years' service.

Applications, in writing, stating age, present appointment and experience, should be forwarded to the undersigned.

F. W. GODDEN, A.M.I.E.E.,
Electrical Engineer and Manager.

Council House,
Coventry. 4847

BOROUGH OF BECKENHAM ELECTRICITY DEPT.

Meter Tester and Repairer

APPLICATIONS are invited for the position of Meter Tester and Repairer for the Corporation's Class A Polyphase Testing Station. Applicants must be fully qualified to test and repair all types of A.C. single and polyphase meters, and experience of other electrical instruments would be advantageous.

Wages and conditions of employment will be in accordance with the D.J.I.C. No. 10 Area Schedule, the present rate being 29.30d. per hour for 47-hour week. Applications, giving particulars of age, experience and technical training, together with copies of recent testimonials, should be forwarded to reach the undersigned not later than April 3rd, 1946.

L. A. GRIPPER, M.I.E.E.,
Borough Electrical Engineer and Manager.

Electricity Offices,
Beckenham, Kent. 123

BEDWAS & MACHEN URBAN DISTRICT COUNCIL

Meter Tester and Repairer

APPLICATIONS are invited for the permanent position of Meter Tester and Repairer in their Testing Station approved under the Electricity Supply (Meters) Act, 1936. Applicants must have had experience and technical training in repairing and testing all types of A.C. Quarterly and Prepayment Meters, Time Switches and Indicating Instruments. Salary in accordance with the National Joint Board Schedule, Class B, Grade 8a.

The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and the successful applicant will be required to undergo a medical examination. Applications, stating age, details of experience and qualifications, and accompanied by copies of two recent testimonials, must be received by the undersigned not later than first post on Tuesday the 2nd day of April, 1946. Envelopes to be marked "Meter Tester" in top left-hand corner.

By order of the Council.

W. EWART MORGAN,
Clerk.

Council Offices, Bedwas, Mon.
12th March, 1946. 122

LINCOLN CORPORATION ELECTRICITY DEPT.

APPLICATIONS are invited from qualified persons for the following positions:

MAINS SUPERINTENDENT (with charge of Substations). Permanent. Applicants must have wide knowledge and experience of the design and layout of high and low tension network, also the operation of Substations and protective systems. Salary in accordance with Joint Board Scale, Grade 3, Class G, £621 per annum.

RESIDENT ENGINEER (temporary). To take charge of civil works in connection with the extension of a Selected Station. Applicants should have a good knowledge of structural steel and ferro-concrete constructions, including Cooling Towers, laying of large pipe lines and general Power Station work. Salary £650-£750 per annum according to ability.

Applications for the above positions, setting out full particulars of training and experience, together with references to be sent to the undersigned not later than 13th April, 1946.

F. NEWEY, ESQ., M.I.E.E.,
Engineer and Manager.

Electricity Department,
Brayford Side North, Lincoln. 4998

BOROUGH OF TORQUAY ELECTRICITY UNDERTAKING

Switchboard Attendant

APPLICATIONS are invited for the position of Shift Switchboard Attendant at the Newton Abbot Power Station. Applicants must be fully conversant with the operation of E.H.T. switchgear and rotary converters.

The salary at present will be in accordance with the N.J.B. Schedule, Class G, Grade 9a, now £307 per annum. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination. Applications, stating age, qualifications and details of experience, together with copies of three testimonials, must be addressed to the Borough Electrical Engineer and Manager, Electric House, Torquay, enclosed in an envelope endorsed "Switchboard Attendant," and received by him not later than the 13th April, 1946.

H. A. HIELD, Town Clerk.

Town Hall, Torquay. 4966

THE NORTHAMPTON ELECTRIC LIGHT & POWER COMPANY LTD.

Mains Construction Assistant

APPLICATIONS for the above appointment are invited from engineers experienced in surveying and levelling, line construction, cable laying and installation, and outdoor substation construction. Salary £400-£450 p.a. according to qualifications.

Applications to reach here by first post on April 2nd.

25, Bridge Street, Northampton. 4992

UNIVERSITY COLLEGE, SOUTHAMPTON

APPLICATIONS are invited for the appointment of an Assistant Lecturer in Electrical Engineering. Particulars may be obtained from the Assistant Registrar. Formal applications should reach him before 1st April, 1946. 4950

RUNWELL HOSPITAL, nr. WICKFORD, ESSEX

Fitter

POWER Plant Fitter required. Must be thoroughly experienced in the operation and complete maintenance of High Speed Steam and Diesel Engines. Age not to exceed 40 years. Appointment subject to the Asylums Officers' Superannuation Act, 1909, and to the Committee's Sick Pay Regulations. Applications to the Physician Superintendent. 4969

A Manager required for small progressive electrical contracting business, Eastern Counties. Would suit ambitious, energetic young man, 25-40, with good practical and technical experience of contracting work. Sound knowledge of estimating and office organisation essential. Must be a worker, able to handle men and staff. Reply, giving detailed experience, age and commencing salary required.—Box 8557, c/o The Electrical Review.

A Tester required for testing small motors.—Max Electric Co. Ltd., 190, Thornton Road, Croydon. Phone, Thornton Heath 4276-7-8. 44

AIR pilot required for electrical concern with contracts throughout Britain. Must be qualified electrical engineer. Preference given to pilot with instructing experience. Reply in the first instance by letter giving full particulars and stating wages required to—Miller & Stables, 16, Northumberland Street, Edinburgh. 118

ARMATURE Winder for small and medium work required by Croydon firm. Trade union conditions.—Box 66, c/o The Electrical Review.

ARMATURE Winder required for A.C. and D.C. rewinds to fractional h.p. motors. Experience on rewinding of Universal motors for electric drills and motors driving machine tools essential. Improver would be considered. —E. P. Barrus Ltd., Brunel Road, East Acton, W.3. 4842

ARMATURE Winders, A.C.-D.C., FHP-10 h.p., good rates, permanency male and female.—Magstarlite Ltd., Beavor Lane, Hammersmith. 8682

ASSISTANT Electrical Engineers, one Senior, one Junior, required by leading Ceylon engineering company. Applicants must have general experience of lighting and power installations, armature winding, transmission workshop routine, stationary batteries, designing, estimating, supervising and handling of labour. The agreement would be one of 4 years, with possible permanency. Write fully, with copies of testimonials, etc.—Box ZC.495, Deacons Advertising, 36, Leadenhall Street, London, E.C.3. 4976

ASSISTANT Electrical Engineer, age about 25, required by Manchester manufacturers, for preparation of specifications, schemes and connection diagrams for electrical storage battery installations. Experience with static rectifiers and control gear essential. Salary according to qualifications and experience. Applications, giving details of training, etc., to—Box 4928, c/o The Electrical Review.

ASSISTANT Experimental Electrical Engineer, with good theoretical background, is required for working in laboratory. Experienced in light precision electrical engineering, with sound mechanical knowledge, capable of designing and testing equipment. Knowledge of optics and photographic apparatus would be useful but not essential. Permanency with option of contributory pension scheme. Salary £400/500 p.a., according to qualifications. Apply in writing, giving full particulars and stating age, training and experience to—Muirhead & Co. Ltd., Elmers End, Beckenham, Kent. 119

ASSISTANT required by Sales Manager of Company manufacturing electrical indicating instruments. London area. Must be thoroughly conversant with indoor commercial routine and export procedure. Able to work on own initiative and control staff. Technical training and experience of instrument trade essential. Reply, stating age, experience and salary required. Our staff are aware of this vacancy.—Box 4902, c/o The Electrical Review.

BUYER (Senior), required by large company of manufacturing electrical engineers. Experience in modern purchasing methods, relating especially to ferrous and non-ferrous metals, manufactured parts and manufacturing plant, small tools and consumable stores, essential. Permanent, progressive, pensionable appointment. Write, stating age, training and experience to—Box 110, c/o The Electrical Review.

CHIEF Draughtsman wanted for firm making electro-mechanical appliances. High standard of technical education required. Write, stating salary, references and experience.—Box 4991, c/o The Electrical Review.

CHIEF Electrical Engineer, by Manchester Collieries Ltd. for the supervision of all electrical maintenance and installation work of the company. Applications, stating experience and present occupation, to be addressed to—The Secretary, Manchester Collieries Ltd., Walkden, nr. Manchester. 4987

CHARGE Hand (Working), used to contractor switch making and winding.—Box 124, c/o The Electrical Review.

CHIEF Inspector required for light repetition mechanical engineering machinery and assembly. Only active man with previous experience will be considered for this vacancy. Manchester area. Salary £450 p.a. Full particulars to—Box 4973, c/o The Electrical Review.

CHIEF Storekeeper required for electrical manufacturers, North-West London area. Good experience of modern stores control essential. Write, stating age, experience and salary required, to—Box 740, Dorlands Ltd., 18/20, Regent Street, S.W.1. 4978

CONTRACTORS require young Class A ex-Serviceman to train as assistant engineer, cable overhead and installation work.—Box 4812, c/o The Electrical Review.

COST and Estimating Clerk required for well-known firm of electrical contractors in London. Write, giving full particulars age, experience, salary required, to—"C.E.C.," c/o Dixons, 43, Gt. Marlborough St., London, W.1. 4931

COST Clerk. Well-known cable company invite applications for above post in Vereeniging, Transvaal. Qualifications: General works experience, stores, accounts and costing an advantage. Young man preferred. Salary £500 per annum to right man (plus cost of living allowance), to commence from date of sailing. Fare paid. Write in first instance, for application forms only, to—Box E.R., Messrs. D. J. Keymer Ltd., Advertising Agents, Effingham House, Arundel Street, Strand, London, W.C.2. Closing date April 8th. 4960

DESIGNER of commercial and industrial lighting fittings for fluorescent, discharge and tungsten lamps required for London by large electrical manufacturers. British national with electrical and illumination training and practical experience. State salary required and full particulars to—Box 4719, c/o The Electrical Review.

DESIGNER required for A.C. and D.C. machines. Some previous experience necessary. Progressive position. Apply to—Higgs Motors Ltd., Witton, Birmingham, 6. 4986

DESIGNER required for special types of D.C. and A.C. electrodynamic machines up to about 20 kW. Previous experience and engineering degree essential.—Box 4860, c/o The Electrical Review.

DESIGNER-Draughtsman (Male or Female) for commercial and decorative lighting fittings. Previous experience in this field essential. Write, stating age, experience and salary required.—Lighting Section, Edison Swan Electric Co. Ltd., 155, Charing Cross Road, London, W.C.2. 4985

DESIGNER-Draughtsmen required by M.K. Electric Ltd. Applications are invited from first-class experienced men who have specialised in the design of electrical accessories, plugs and sockets, switches, switch-sockets, etc. All applications, in strict confidence, to—The General Works Manager, M.K. Electric Ltd., Wakefield Street, Edmonton, London, N.18. 4878

DISPATCH Clerk and trade counter assistant required by wholesalers. Must be fully conversant with electrical material.—London Electrical Company, 92, Blackfriars Road, S.E.1. 94

DRAUGHTSMAN/Designer required by small electrical apparatus and plastic moulding manufacturers. Interesting work. Please state salary required and full particulars of past experience. London area.—Box 4946, c/o The Electrical Review.

DRAUGHTSMEN for Design of Radio and Communication Equipment. Previous experience in this class of work desirable but not essential, but drawing office experience in electrical-mechanical apparatus essential. Salary up to £420 per annum, inclusive of cost-of-living bonus, according to experience and ability. Write to—Staff Dept., Marconi's Wireless Telegraph Co. Ltd., Chelmsford. 4948

DRAUGHTSMEN. One junior and one senior electrical draughtsman required, preferably with some experience in electric motors and other electrical rotating machinery and workshop background. Write, giving particulars of age, educational qualifications, experience and salary required to—Personnel Manager, Small Electric Motors Ltd., Churchfields Road, Beckenham. 4799

ELECTRICAL Contractors (London) require Female Clerk with some experience of costing records, knowledge of typing essential. Apply, giving full particulars, to—Box 4743, c/o The Electrical Review.

ELECTRICAL Contractors require Electrical Wiremen and Assistants for London, Home Counties, North-West, South-West, South of England and Scotland. Apply —Troughton & Young Ltd., Imperial Court, Basil Street, London, S.W.3. 84

ELECTRICAL Engineer required, age 30-40, with buying and selling experience in all kinds of electrical plant. Commencing salary £500 per annum. Full details as to experience, etc., to—Cox & Danks Ltd., Plant & Machinery Dept., Faggs Rd., Feltham, Middx. 4933

ELECTRICAL Engineers, Manchester district, offer opportunities to young persons, 21/24, having H.N.C. or equivalent in electrical engineering.—Box 4888, c/o The Electrical Review.

ELECTRICAL Engineer required for post abroad, knowledge turbines and turbo generators, etc., essential, to maintain electrical equipment and act as second engineer on sugar estate. Write, giving particulars, experience and references to—Box R.P.I., c/o 95, Bishopsgate, London, E.C.2. 102

ELECTRICAL Plant Inspectors. Applications invited for vacancies in London, Leicester, Bristol, Belfast, Dublin. Apprenticeship and experience in the manufacture, repair and industrial use of electrical machinery. Technical education at least Higher National Certificate standard. Progressive salary scale and non-contributory pension. Candidates, not exceeding age 35, should apply in own handwriting, stating age, qualifications and experience to the—British Engine, Boiler & Electrical Insurance Co. Ltd., 24, Fennel Street, Manchester, 4. 4996

ELECTRICIAN-Wiremen for general electrical work on large contracts; permanencies to suitable applicants.—J. W. Russell Ltd., Electrical Contractors, 18, Queens Road, Watford. 37

ELECTRICIANS and Assistants required for general installation work in East Anglian area. Write full particulars or call at—F. H. Wheeler & Co. Ltd., 12, Bridge Street, Thetford, Norfolk. 4932

ELECTRICIANS, 1st-class Lond. work only, highest rate. —Henfrey Electrical, 42, Gt. Titchfield St., W.1. 4751

ELECTRICIANS required for all types of installation work. Please apply to—J. H. Plant Ltd., 99, St. Martin's Lane, Charing Cross, W.C.2. 34

ELECTRICIANS required for general installation work in the London area. Write full particulars to—F. H. Wheeler & Co. Ltd., 39, Victoria Street, S.W.1. 4898

ELECTRICIANS required for special high-class installation work, country and London. Permanency and good prospects to satisfactory tradesmen. Ring Abbey 2321, Pemlec Ltd., 34, Victoria St., London, S.W.1. 4725

ELECTRICIANS wanted for London area. Permanent jobs for first-class men. Apply—S. Rogers & Co., 7, Bloomsbury Street, W.C.1. 25

ELECTRICIANS wanted. Permanent employment to suitable applicants. Comfortable working conditions, top rates of pay and liberal allowances.—C. A. Newton & Co. Ltd., St. James's St., Derby (Derby 46015-16). 4975

ENGINEER, experienced in erection of turbo-generators and heavy electrical plant, required for India. Single man under 35 preferred. Permanent pensionable post with good salary for suitable man. Applications with full details experience to—Box 4870, c/o The Electrical Review.

ENGINEERS and Draughtsmen are invited to apply for technical positions in the switchgear and heavy electrical plant departments (covering switchgear, electrical machines and transformers of all kinds) of a large electrical engineering manufacturer in the Midlands. Applications stating age, appropriate technical qualifications and industrial experience, and order of salary required, to—Box 69, c/o The Electrical Review.

ERECTING Engineers required to travel country, installing instrument and control contacts in industrial works and power stations. Applicants must be keen, energetic and capable of controlling labour and have knowledge of electrical wiring and small bore pipe fitting. Good wages, out allowance and prospects for right men. Apply, giving details of past experience to—Box 4835, c/o The Electrical Review.

FOREMAN Electrician required in South-West area for large contracting firm. Permanent situation for suitable man. Write, giving full details, to—Wheeler, 6, Queen Square, Bristol, 1. 8642

FOREMAN of Moving Coil/Iron Instrument Assembly. Capable man, experienced in supervising production of these products, is offered good salary, output bonus and prospects. Please write fully.—Box 4843, c/o The Electrical Review.

FOREMAN required by firm of electrical manufacturing engineers. Applicants must have thorough all-round workshop experience (not mass production) and be capable of instructing. Write, stating age, training, full details of experience, and salary required, to—Box 4974, c/o The Electrical Review.

FOREMAN (Staff) for W. London works, to take charge of electrical repair shop. Applicant must have had experience of rewinds and repairs for A.C. and D.C. machines and switchgear up to 500 kW, also suitable test bed experience with leading manufacturer.—Box 4939, c/o The Electrical Review.

FOREMAN, with thorough knowledge of electrical machinery; Winders, also Chargehands with some electrical experience, for large repair shop, N.W. London. Good wages and prospects offered.—Box 4981, c/o The Electrical Review.

FULLY experienced Lighting Engineer Salesmen for leading firm of Fittings Manufacturers, one for Lancashire and one for London area. Only fully-trained men need apply. Our own staff have been advised of these vacancies. Apply—Box 4901, c/o The Electrical Review.

GENERAL Clerk, knowledge of book-keeping, small office, good prospects, permanency, suitable applicant—A. E. Co., 2, Henriette Street, W.C.2. 4834

INSTRUMENT Makers for Model Shop. Capable men, experienced at bench and also on lathe, millers, etc. Previous experience essential. Model making small and intricate mechanisms. Top rates. Manufacturing electrical engineers, situated in North London. Apply—Box 4877, c/o The Electrical Review.

JUNIOR Draughtsmen, Estimators and Cost Clerks required by electrical contractors. Apply—Troughton & Young Ltd., Imperial Ct., Basil St., London, S.W.3. 85

LADY Shorthand Typist required immediately, apply stating speeds, age, and salary required to—Collins Electrical Ltd., 115 Clerkenwell Rd., London, E.C.1. Telephone Number, Holborn 0212. 4815

LIFT Erector (Electric), Birmingham district.—Box 125, c/o The Electrical Review.

LIGHTING Engineer and Draughtsman, with experience in industrial and commercial schemes, required by Metropolitan-Vickers Electrical Co. Ltd. Apply, writing only, to—Chapel Walk, Fargate, Sheffield. 8639

LIGHTING Fittings and Illumination Commercial Technical Work. Large electrical manufacturers require for London office a well-educated British subject with electrical and illumination training and commercial experience. Varied work, sales correspondence, lighting schemes, etc. Permanent and progressive post. Particulars and salary required to—Box 4735, c/o The Electrical Review.

LONDON Wholesalers require travellers to cover London, Birmingham and West Country areas in connection with the sale of electrical appliances. Part time on a 5% commission basis or full time with salary of £5 per week and 1¾% commission and expenses. Please submit full details in writing to—Box 4997, c/o The Electrical Review.

ORGANISATION (not Manufacturers) in London require engineer having experience in preparing and examining tenders and contracts for steam turbo-generator plant. Age not above 40. Apply, stating full experience, present employment, and salary expected. All applications will be treated in strictest confidence.—Box 8629, c/o The Electrical Review.

RADIO and Refrigerator Mechanics, with pre-war training with manufacturers on servicing and repairs of consumers' apparatus, or equivalent experience in other high-grade servicing agencies. Rate of pay 2s. 6½d. an hour for qualified men. Apply—The East Anglian Electric Supply Co. Ltd., Finborough Hall, Stowmarket, Suffolk. 4937

RADIO Engineer, with pre-war experience design and development commercial radio and television receivers, wanted for laboratory of radio manufacturers and engineers in London area. Only first-class men need apply. Write stating age, experience, salary required.—Box K2079, A.K. Advg., 212a, Shaftesbury Avenue, W.C.2. 4851

REPRESENTATIVE required by London Contractors; expenses and commission; good support will be given. Reply, in confidence—Box 4903, c/o The Electrical Review.

REQUIRED by firm of scientific instrument makers in West London area, Senior Draughtsmen for design work on marine and aircraft equipment. Must have good electrical knowledge and sound engineering training. Junior Draughtsmen for detailed work and wiring layouts. Also Senior Jig and Tool Draughtsmen. Reply, stating age, training, full details and experience, and salary reqd., to—Box 2326, c/o White's Ltd., 72 Fleet St., E.C.4. 4848

SALES Representatives required by electrical wholesalers in the following territories (1) London. (2) Kent and East Sussex. (3) Hampshire and Wiltshire. In which there are well established connections. Preference given to experienced men living in the territory and who possess cars. Remuneration on salary, commission and expense allowance basis.—Apply Box 8661, c/o The Electrical Review.

SALESWOMAN. Large electrical contractors in the N.W. London area require an experienced Saleswoman to fill responsible position in showrooms. Reply, stating age and giving full details of experience, to—Box 4953, c/o The Electrical Review.

SENIOR Draughtsman required by manufacturers of small and medium transformers, and light electrical equipment, N.W. London Area. Successful applicant must have some knowledge of transformers, and be well versed in manufacturing design, and associated tool design. Full details of age, experience and salaries earned to—Box 4800, c/o The Electrical Review.

SALESMAN required for high-class Electric Fittings Showrooms with West End experience. Apply—Secretary, Maple & Company Limited, Tottenham Court Road, W.1. 4900

SENIOR Planning Engineer sought by well-established and expanding Northern firm, light electro-mechanical precision engineering. Applicants capable of organizing the efficient and rapid planning of intricate mass-produced apparatus. Excellent prospects for right man, but consideration only given applicants of first-class experience and ability. Salary commensurate with qualifications. Apply, stating qualifications, experience, and salary asked, to Box No. 918, 191 Gresham House, London, E.C.2. 4965

SHORTHAND typist, small office, good prospects, permanency suitable applicant—A. E. Co., 2, Henrietta Street, W.C.2. 4833

SPECIAL Sales Representative, experienced in calling on departmental stores and borough councils required by electrical wholesalers. This is a vacancy for a first-class man with personality and initiative, who will be adequately remunerated on salary, commission and expense allowance basis. Apply—Box 8662, c/o The Electrical Review.

SWITCHBOARD Attendant wanted in a N.W. England power station. The remuneration will be the D.J.I.C. rate at present 28.25 pence per hour for a 48 hour week. The appointment will be subject to the Local Government Superannuation Act, 1937, and the person appointed will be required to pass a medical examination. Applications stating age and giving full particulars of experience, should be accompanied by two testimonials.—Box 4994, c/o The Electrical Review.

TECHNICAL Engineer, with experience in the preparation of electrical traction control schemes, design of apparatus, and the handling of contracts. Good practical experience and technical education essential, but anyone having industrial D.C. experience would be considered. Sal. £500-£600 p.a.—Box 4853, c/o The Electrical Review.

TECHNICAL Sales Engineer required to promote the sale of modern high frequency heating equipment. Applicants must have the following qualifications: (1) Knowledge of modern methods of heat treatment of metals; (2) Experience in eddy current heating methods essential; (3) Must have sound qualifications and also industrial experience. All applications treated in strictest confidence. Please apply, stating full particulars of experience, to—Box 4947, c/o The Electrical Review.

TRANSFORMER Assembly Shop Foreman required for work up to 25 kVA. Previous experience in similar position transformer manufacturer essential, London area.—Box 4563, c/o The Electrical Review.

TRANSFORMER Design Engineer required by progressive firm manufacturing all types of transformers up to 1,000 kVA. Write, giving full particulars of training, experience, age and salary required.—Box 4964, c/o The Electrical Review.

WINDING Chargehand required to take charge of f.h.p. stator winding dept. Used to quantity production. Permanent and progressive position for suitable applicant. Manchester district. Reply, stating age, experience.—Box 4929, c/o The Electrical Review.

WORKS Manager. Large manufacturers of electrical machinery invite applications from men possessing first-class experience in this capacity, embracing production and administrative responsibility in an engineering concern. Permanent, pensionable and progressive appointment. Applicants, age 35 to 45, must have had full electrical and mechanical engineering training, preferably graduate standard, followed by practical experience in charge of production. Write, stating age, education and experience, to—Box 4945, c/o The Electrical Review.

WORKS Manager required for light engineering works, West London area. Applicants should have previous experience in works management and sound engineering training. Good position and prospects for the right man. State fully experience, training, age and salaries earned.—Box 4936, c/o The Electrical Review.

APPOINTMENTS FILLED

Dissatisfaction having been so often expressed that unsuccessful applicants are left in ignorance of the fact that the position applied for has been filled, may we suggest that Advertisers notify us to that effect when hey have arrived at a decision? We will then insert a notice free of charge under this heading.

BOX 8295—Managing Director for Cable Co.; County Borough of Preston—Control Engineer; London & Home Counties Joint Electricity Authority—Area Officers, District Officers and Purchasing Officer. All applicants are thanked.

SITUATIONS WANTED

AMBITIOUS young man desires post in Electronic Research. Radio, electrical exp., N.C. grade, London preferred.—Box 8633, c/o The Electrical Review.

A Chartered Electrical Engineer, aged 35, with University and Works training, and 15 years' experience in responsible positions with supply undertakings, manufacturers and contractors, desires position as technical representative. Minimum salary, £600 per annum.—Box 8667, c/o The Electrical Review.

A Technical Engineer, age 27, 4½ years' experience in design, manufacture and test of automatic control gear and industrial switchgear, also contract work and estimating, good organiser and administrator, seeks position offering interest and scope in London. Keen on contactors and their use in control engineering, interested in traction work. Initial salary £500, but will consider any genuinely progressive offer.—Box 8601, c/o The Electrical Review.

A young Electrical Engineer with practical and sales experience, desires an outside position entailing the use of a car. Higher National Certificate, A.M.J.I.E., Stu.I.E.E., medical exempt, willing to go anywhere and do anything.—Box 8624, c/o The Electrical Review.

ADVERTISER who has first-class connection throughout Scotland with electrical wholesalers, supply authorities, etc., is open to consider representation of reputable manufacturers of domestic appliances, switchgear and general supplies.—Box 8634, c/o The Electrical Review.

A M.I.C.E., with good experience of power, steam, gas and water, requires position in technical or maintenance capacity. Write—Box 8636, c/o The Electrical Review.

A M.I.E.E., age 30, with five years' experience technical staff, Admiralty, and nine years' electricity supply, desires suitable responsible position.—Box 8672, c/o The Electrical Review.

A M.I.E.E., 42, desires administrative position in which initiative can be used, with manufacturers and/or repairers of domestic or small electrical equipment. Considerable experience in senior positions with Supply Authorities, involving sale and repair of domestic apparatus, and six years very varied work on maintenance and repair in electrical branch of R.N.V.R. Recently demobilised, and available now. Approximate salary £1,000 p.a., depending on prospects.—Box 8680, c/o The Electrical Review.

A M.I.E.E., A.M.I.Mech.E. (30), Electrical Engineer, lieut.-col. in R.E.M.E., available Class A release May, requires permanent responsible situation with prospects. Has sound industrial training, proved organising and technical ability, excellent references. Salary £800.—Box 8643, c/o The Electrical Review.

A M.I.E.E. (38), 15 years mining electrical, 6 years sea-going wireless operator, 5 years Admiralty overseer, experience installation and maintenance light and heavy plant, A.C. and D.C., desires progressive position. Release obtainable.—Box 8638, c/o The Electrical Review.

A M.I.E.E. (49), at present holding responsible technical position in large manufacturing organization, desires new post, London area preferred. Any suitable post would be considered, even if it were not primarily one of electrotechnics. Personally and technically known in industry, widely in U.K. and further. Four-figure salary only considered.—Box 8644, c/o The Electrical Review.

AN Engineer (36), first-class experience of large A.C. and D.C. factory maintenance, Diesel generation and distribution, desires progressive post.—Box 8635, c/o The Electrical Review.

ARMATURE Winder, age 35, high-grade, last six years in charge of female winding shop on F.H.P. Armatures, requires similar situation where initiative can be used.—Box 8578, c/o The Electrical Review.

B.Sc.(Eng.), A.M.I.E.E. (33), desires progressive position, London area preferred; 6 years as naval electrical officer; previous experience in control gear, metering equipment, installation specifications. Minimum salary £500.—Box 8595, c/o The Electrical Review.

BUYER, aged 41, requires change. First-class experience of material requirements for electrical and engineering trades. Used to large purchases.—Box 8679, c/o The Electrical Review.

CASHIER/Clerk, 20 yrs.' experience telecommunications and transmission contracts, wages, stores supervision and contract office control.—Box 8596, c/o The Electrical Review.

CHIEF Electrical and Mechanical Designer, M.Sc., electric motors, generators, specialist f.h.p. motors, fans, household appliances, latest design, seeks adequate post in industry or with consulting engineers.—Box 8606, c/o The Electrical Review.

CONTRACT or Sales Engineer, with extensive experience, accustomed to negotiating and handling contracts, generating plant, D.C. and A.C. motors, switchgear, transformers, all types power and installation work, estimating, costing, and administration, desires position of trust and responsibility. Highest testimonials. Min. salay £400.—Box 8664, c/o The Electrical Review.

CHIEF Draughtsman desires change, similar position or as technical assistant to works manager; experience light engineering, electrical and mechanical instruments and equipment for mass production commercial and aircraft: London preferred.—Box 8641, c/o The Electrical Review.

CHIEF Storekeeper, over 20 years' experience wholesale electrical trade, fully conversant with accessories and domestic appliances, etc., desires change.—Box 8598, c/o The Electrical Review.

COMPETENT Electrical Engineer, aged 42, desires responsible position. Extensive experience of installation and maintenance of power plant; D.C. and A.C. in large works and factories. Good organising ability. Minimum salary, £400.—Box 8665, c/o The Electrical Review.

ELECTRIC Motor Control, Contactor and Switchgear Engineer requires progressive post.—Box 8609, c/o The Electrical Review.

ELECTRICAL and Radio Engineer in executive position, twelve years' experience development, design, production, organization, foreign languages, desires responsible position in electrical, instrument or radio industry. Available May. First-class references.—Box 8666, c/o The Electrical Review.

ELECTRICAL Designer, D.C. and A.C. machines, 26 years' design experience.—Box 8622, c/o The Electrical Review.

ELECTRICAL Engineer requires responsible position of trust. Comprehensive experience of large industrial installations, H.T. and L.T. distribution systems, motors, etc., labour control and organising ability.—Box 8612, c/o The Electrical Review.

ELECTRICAL Engineer, well qualified and experienced design, production, technical sales power and rectifier transformers, desires position of responsibility in Greater London area.—Box 8673, c/o The Electrical Review.

ELECTRICAL Engineer, 20 years in construction and maintenance of traction, industrial and distribution equipment, requires post where wide experience is a qualification. Class "A" Release.—Box 8588, c/o The Electrical Review.

ELECTRICAL Engineer (24) seeks employment in England or abroad. ex-B.T.H. apprentice, H.N.C. —Box 8572, c/o The Electrical Review.

ELECTRICAL Engineer (27), Nat. Cert. Elect. & Mech. Eng., indentured apprentice, R.E.M.E. officer, 6 years' service, free May, seeks post with prospects London area.—Box 8625, c/o The Electrical Review.

ELECT. Engineer (43), seeks executive post with progressive firm. 15 years' contracting, 10 years' London consulting experience on industrial and commercial schemes.—Box 8671, c/o The Electrical Review

ELECTRICAL Maintenance Engineer requires position. Experience A.C. and D.C. systems; 15 years' pre-war exp., now demobbed.—Box 8652, c/o The Electrical Review.

ELECTRICAL Manufacturers' Technical Representative, 25 years London and Home Counties, desires change for another group or firm. Rapidly increasing sales record proved. Remuneration adjusted according to terms on which car is provided, firm, or by me.—Ruislip 3529. 8659

ENERGETIC Young Engineer, Grad. I.E.E., experience time study, shop layout, f.h.p. motor production, fabrication, etc., requires position medium-sized company with salary proportional to ability, and scope for initiative. —Box 8637, c/o The Electrical Review.

ENERGETIC young man, returning this summer to Perth, Australia, desires progressive position as Representative for electrical manufacturer. Experience with wholesale distribution. Willing to specialise.—Box 8650, c/o The Electrical Review.

ENGINEER, University graduate, 28, seeks position of responsibility in contracts or sales; London area; salary £500-£600.—Box 8659, c/o The Electrical Review.

ENGINEER, 51 yrs., seven years manager elec. contractors and five years consulting (all services) Air Ministry and M.A.P. Excellent contacts and can introduce business. Free, as present employer is closing down. Similar position with prospects required.—Box 8600, c/o The Electrical Review.

ESTIMATOR, Sales Correspondent (47), assoc. rubber and paper insulated cables, desires change, prospects. Good credentials.—Box 8558, c/o The Electrical Review.

EX-Elect. Lieut. R.N.V.R. seeks position abroad or U.K. as Sales Engineer or Representative. Technical and practical experience.—Box 8651, c/o The Electrical Review.

EX-R.A.F., Public School, desires change; conversant with installation requirements and electrical accessories, including domestic appliances. Knowledge of estimating and general office administration; wishes to work hard for promotion.—Box 8668, c/o The Electrical Review.

FOREMAN Electrical Fitter (32), varied experience, at home and abroad, seeks appointment in company engaged on repair, manufacture or maintenance of electrical apparatus. Strict disciplinarian; preferably East London or Essex area.—Box 8627, c/o The Electrical Review.

FOREMAN Electrician seeks position, preferably with supply authority. Fully conversant installations, domestic appliances. Ex. refs.—Box 8653, c/o The Electrical Review.

LEAD Acid Accumulators. Advertiser, age 38, seeks executive position; 20 years' general experience with all types and modern methods.—Box 8618, c/o The Electrical Review.

PUBLIC Relations Officer, Development Officer (or similar appointment of responsibility). Advertiser having 20 years' comprehensive commercial experience of the electricity supply industry seeks appointment where his knowledge can be used to mutual advantage. Good appearance and approach, progressive mind, unimpeachable references. Commencing salary £360-£400 per annum. Would consider Dominions appointment.—Box 8602, c/o The Electrical Review.

REPRESENTATIVE, Technical, 10 years' experience London area, extensive connection, desires to represent manufacturer.—Box 8654, c/o The Electrical Review.

SALES Manager desires to meet manufacturers of lighting equipment.—Box 8655, c/o The Electrical Review.

SPECIALIST Design Engineer of lighting fittings (metal, glass and plastics), for Tungsten and Discharge Lamps, seeks central London post. £600 p.a. min.—Box 8632, c/o The Electrical Review.

TECHNICAL Assistant, or supervising position with progressive Coal Co. desired by young man (22), Stud.I.E.E., Final C.G.L.I.(Elec.), 1st Class A.M.E.M.E., extensive training D.C. and A.C.—Box 8669, c/o The Electrical Review.

FOR SALE

Traders buying and selling hereunder must observe the Restriction of Resale Order, S. R. & O. 1942 *No.* 958.

BOROUGH OF LEIGH ELECTRICITY DEPT.

Sale of Plant.

OFFERS are invited for the purchase of the undermentioned equipment:—

GENERATOR.—1 steam driven, 500kW, 440/470 volts, Direct Current Generator, comprising: James Howden & Co. Double-Acting, Triple expansion 180 lbs. steam pressure, direct coupled to Bruce Peebie's 500-kW, 440/470 volts, D.C. Generator, 300/330 r.p.m.; Control Panel, 2 D.C. Whipp & Bourne D.C. Circuit Breakers.

DYNAMOS.—2 old Dynamos, 300 volt, 135 amps. by Mather & Platt.

METERS.—168 Ferranti and C. & H. D.C. Meters, from 2½ amps. to 100 amps.

The successful Tenderer will be required to provide his own labour and tackle for the removal of the plant. Further particulars, and permission to view, may be obtained from the Borough Electrical Engineer, Electricity Offices, Bradshawgate, Leigh, Lancs. Tenders, endorsed "Tender for Plant," are to be delivered to the undersigned not later than Tuesday, April 2nd, 1946.

ALBERT JONES,
Town Clerk.

Town Hall,
Leigh, Lancs. 104

BRIERFIELD U.D.C. ELECTRICITY DEPARTMENT.

THE Council invite offers for the purchase and removal from site of the following:—

1 Motor Generator, consisting of 65 h.p., 3-phase, 400-volts, 50-cycles Motor, and direct coupled 40-kW, D.C. Generator, 220/240 v., complete with Oil Immersed Star/Delta Starter, of Messrs. George Ellison's manufacture. The Motor and Generator are of the English Electric Company's manufacture.

These machines are actually on load operation, and can be viewed under load conditions. Further particulars may be obtained from N. Ashton, A.M.I.E.E., Engineer and Manager, "Electricity House," Colne Road, Brierfield. Offers to be made in sealed envelopes, endorsed "Motor-Generator," and lodged with the undersigned not later than the 12th April, 1946. The Council do not bind themselves to accept the highest, or any offer.

H. L. SMITH,
Clerk to the Council.

Town Hall,
Brierfield, Lancs.
15th March, 1946. 105

FOR IMMEDIATE DISPOSAL

CROMPTON Parkinson Motor, 3 h.p., 3-phase, 5 amps., 400 v., 50 cycles, 1,390 r.p.m. In good condition. With rotary exhauster with 2" suction and outlet and Allen West oil-immersed starter, type S.R.O.

Crompton Parkinson 1.5 h.p., 50 v., 3-phase, 50 cycles, 20 amps., 1,450 r.p.m., direct coupled to Merrilees Watson cent. pump, 2" suction, 3" delivery. On wheeled chassis and Brit. Elec. Transformer, type A.N., 3-phase, 50 cycles, 400 to 50 v. at no load, 3.25 amps.

Offers should be addressed to the Brighton Corporation, Entertainments Department, Circus Street, Brighton, to reach that address not later than 10 a.m. on the 1st April, 1946. 4962

WEST SUSSEX COUNTY COUNCIL—PLANT

THE County Council have for sale the following:—

1. Deepwell Pump.
2. Generating Plant, A.C. and D.C.
3. Petter Petrol-Paraffin Lighting Plant.
4. Ruston-Hornsby Generating Plant.
5. Steam-driven Generator Set.
6. Collar Blocking Machine.

Further particulars and forms of tender can be obtained on application to the undersigned.

T. C. HAYWARD,
Clerk of the County Council.

County Hall, Chichester.
March, 1946. 4957

A reliable Watertight Bakelite Lampholder, passed by the L.C.C. and fire authorities; used by the Admiralty and all municipal bodies. Needs no tools or screws. For use on 7/.029 T.T.R. cable. Known all over the world as the "Beeantee" Interchangeable Lampholder.—The Beeantee Illuminations (London) Ltd., 6, Upper Street, Islington, London, N.1. Tel. No. Canonbury 4555. 73

A.C. and D.C. House Service Meters, all sizes, quarterly and prepayment, reconditioned, guaranteed one year. Repairs and recalibrations.—The Victa Electrical Co., 47, Battersea High Street, S.W.11. Tel. Battersea 0780. 19

A.C. and D.C. Motors, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Milo Road, East Dulwich, S.E.22 (Forest Hill 2278-9) 8512

A.C. Motors, 1/75th h.p. to 10 h.p., all voltages. Also D.C.—The Johnson Engineering Co., 319, Kennington Road, London, S.E.11. Telephones, Reliance 1412/3. 57

ALTERNATORS: One Oerlikon, 112 kVA, 750 r.p.m., 400 v., 3-ph., 50 cycles, with switchboard and voltage regulator; one Oerlikon, 112 kVA, 750 r.p.m., 220 v., 3-ph., 50 cycles; one Oerlikon, 30 kVA, 750 r.p.m., 220 v., 3-ph., 50 cycles, with switchboard; one Westinghouse, 55 kW, 375 r.p.m., with switchboard. Slip Ring Induction Motors, 400 v., 3-ph., 50 cycles; one 20-h.p. Higgs, 715 r.p.m.; one 15-h.p. E.C.C., 1,450 r.p.m., totally enclosed, crane rating; six 12-h.p. Brush, 1,450 r.p.m.; one 12½-h.p. Verity, 960 r.p.m.; one 10-h.p. Brush, 960 r.p.m., totally enclosed, crane rating; one 6-h.p. L.S.E., 560 r.p.m.; and one 2½-h.p. L.S.E., 1,440/720 r.p.m.—Oldfield Engineering Co. Ltd., 96, East Ordsall Lane, Salford, 5. 4647

ATTRACTIVE Weekly Offers from The Electroplant Co., Wembley, Middx.: (a) 750-kW Belliss-Morcom Siemens Steam Generating Set, 440 v., 3-ph., 50 per., triple expansion, 185 lbs. steam superheat, 250 r.p.m., complete with surface condenser and all auxiliaries; (b) 300-kW Belliss-Morcom Phœnix Steam Generating Set, 500 v., 3-ph., 50 per., triple expansion, 160/220 lbs. steam, 300 r.p.m., complete with surface condenser and all auxiliaries, 400 kW at 440 v.; (c) 350-kW Mirrlees-Westinghouse Diesel Generating Set, 415 v., 3-ph., 50 per., air blast injection, 4 cyl., 200 r.p.m., cold start, complete with all accessories, switchboard and gantry. 4980

AUTOMATIC Telephone Switchboard, 50-line, fully equipped, type 2000, by G.E.C., complete with 60-a.h. battery, stand and trickle charger, in perfect working order.—Box 4934, c/o The Electrical Review.

BAKELITE Festoon Striplighting Holders for 7/.029 T.T.R. cable are now available for the coming celebrations. Write or 'phone—The Beeantee Illuminations (London) Ltd., 6, Upper Street, Islington, London, N.1. Telephone Number, Canonbury 4555. 72

BURDETTE & Co. Ltd. stock Reconditioned A.C. and D.C Motors and Starters equal to new. Day and night service.—Stonhouse St., Clapham, S.W.4. Mac. 4555. 17

COMPLETE House Lighting Plant, comprising 5-h.p. Lister Engine, 2 flywheels and pulley; 2½-k. Lister Dynamo, 50/60 v.; 30-cell, 2,500-amp.-hours Battery set on well-built stages (Alton Battery Co. Ltd.); Switchboard. All in good running order. Recently superceded by public supply. Can be seen running at—Frimhurst Country Club, Frimley Green, nr. Aldershot, Hants. 8645

COMPLETE Power Station for sale in South Wales: 2 1,500-kW Westinghouse Turbo-Alternators, 200 lbs. pressure, 6,600/3/50, 3,000 r.p.m., with jet condensers and switchear and auxiliaries; 1 3,000-kW Adamson/Siemens Turbo-Alternator, new 1941, 250 lbs. pressure, 3,000 r.p.m., with surface condenser, switchgear and auxiliaries; 1 3,750-kW Adamson/G.E.C. ditto; 1 Stirling Water Tube Boiler, 56,000 lbs. evaporation, 210 lbs. pressure; 2 Babcock & Wilcox Water Tube Boilers, 25,000 lbs. evaporation, each 210 lbs. pressure; 1 Thompson Water Tube Boiler, 25,000 lbs. evaporation, 200 lbs. pressure; 2 Thompson Water Tube Boilers, 12,500 lbs. each evaporation, 200 lbs. pressure; 2 30′ × 8′ 6″ Yates & Thom. Lancs. Boilers, 160 lbs. pressure; 4 30′ × 8′ 6″ Thompson Lancs. Boilers, 160 lbs. pressure, fitted with turbine furnaces; 1 30′ × 9′ Danks Lancs. Boiler, 180 lbs. pressure; 2 30′ × 8′ 6″ Danks Lancs. Boilers, 160 lbs. pressure; 2 9,000-g.p.h. Hall Feed Pumps, 200 lbs. pressure; 2 7,000-g.p.h. Weir ditto; 2 5,500-g.p.h. ditto; 2 4,000-g.p.h. ditto; 2 self-supporting Steel Chimneys, 10′ dia. × 90′ high; Induced and Forced Draught Fans. Elevators, Motors, etc. Further details on request from—B.C.S. (Engineers & Contractors) Ltd., Taffs Well, nr. Cardiff. Phone, Taffs Well 296. 4984

D.C. Generator, in excellent condition, made by English Electric Co., 20 kW, 230 v., 87 amps., 1,070 r.p.m., fitted with "V" rope drive.—J. Brooksbank, Son & Co. Ltd., Embsay Tannery, Skipton. 4879

ELECTRIC Motors and Dynamos. We hold one of the largest stocks of new and secondhand motors. Secondhand machines are thoroughly overhauled. Inspection and tests can be made at our works. For sale or hire. Send your enquiries to—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, City Road, London, N.1 (Phone, 5512-3 Clerkenwell). 13

ELECTRICAL Appliances: Lighting, Cycle and Wireless Batteries, Electric Fires, Irons, Table Lamps, beautiful range of artistic and plain Lamp Shades, pendant, table and floo. standard designs. Good deliveries in rotation. Write for new list. Customers are welcome to visit our Sample Showrooms.—Brooks & Bohm, Ltd., 90, Victoria Street, London, S.W.1. Phone, Victoria 9550. 61

ENGINE-driven Generator, etc. 1 Lister Petrol/Paraffin Engine, 2½ h.p., 600 r.p.m., belt driven to Newton D.C. generator, 50/75 v., 18 amps., 1,580 r.p.m.; 26 Hart Lead Acid Cells, totally enclosed, 150-amp. hrs. capacity; 1 Charging Switchboard and Control Unit; 1 Heayberd A.C. to D.C. Rectifier Unit.—Oldfield Engineering Co. Ltd., 96, East Ordsall Lane, Salford, 5. 4648

FLUORESCENT Lighting Choke, 80 watt. Prompt attention to all enquiries. Quantities available.—J. G. Elliot, 32, Plaistow Avenue, Birmingham, 8. 8517

EX stock, 1 New Vertical Lancashire Dynamo Totally Enclosed 8-h.p. Motor, 950 r.p.m., for 200 v., 2-ph., 50 cys., with starter complete.—H. J. H. King & Co. Ltd., Nailsworth, Glos. 4949

FIRE Spirals, 230/50 volt, 750 watts, 72/- gross; 600 watts, 60/- gross. Carriage paid.—Box 8681, c/o The Electrical Review.

FLUORESCENT Lighting Chokes, 80 watt, impregnated and in standard size bitumen-filled metal boxes with mounting feet, 230 v., 19s. each; also tapped for other voltages, 21s. each. Quantities available. Also few cwt. No. 4 Stalloy Stampings for disposal.—Champion, 43, Uplands Way, London, N.21. Phone, Lab. 4457. 8683

GEORGE Cohen, Sons & Co. Ltd. for guaranteed Electrical Plant, Motors, Generators, Switchgear, etc.—Wood Lane, London, W.12 (Telephone, Shepherds Bush 2070) and Stanningley, near Leeds (Telephone, Pudsey 2241). Established 1834. 27

GLOBELITE and Double Anchor Lighting and Wireless (Torch, Pocket Lamp, etc.) Batteries. Now superior peace-time quality only. All types fully guaranteed. Supplied for home trade and export. Distributors—Brooks & Bohm Ltd., 90, Victoria Street, London, S.W.1. Tel. Vic. 9550. 47

GLOBELITE and Double Anchor Electric Fires, superior quality only. Supplied for home trade and export. Distributors—Brooks & Bohm Ltd., 90, Victoria Street, London, S.W.1. Tel. Vic. 9550. 48

JUNCTION Electric Irons, superior design and quality, supplied with suitable stand. Also Junction Nickel-plated Torch Cases. Supplied for home trade and export. Distributors—Brooks & Bohm Ltd., 90, Victoria Street, London, S.W.1. Tel. Vic. 9550. 49

LESLIE Dixon & Co. for Dynamos, Motors, Switchgear, Chargers and Telephones.—214, Queenstown Road, Battersea, S.W.8. Telephone, MACaulay 2159. Nearest Rly. Sta.: Queen's Road, Battersea (S.R.). 18

LISTER-Light 2.5-kW Set and Switchgear for sale, direct coupled, petrol engine, no batteries. Can be seen working. Best offer over £200.—Wynstones School, Whaddon, Glos. 8631

MONOMARK. Permanent London address. Letters re-directed. 5s. p.a. Write—BM/MONO53, W.C.1. 68

MOTOR Generator Sets and Convertors, all sizes and voltages from ½ kW up to 500 kW in stock.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, City Road, London, N.1. Telephone, Clerkenwell 5512, 5513 & 5514. 28

MOTOR Generator, 1,000 amps., 60 volts, 970 r.p.m., complete on bedplate, slip ring motor 95 h.p., 3-phase, 50 cycles, 400 volts A.C., complete with rotary starter control panel, nearly new. One Generator only (belt driven), maker D & M., Wembley, 60 volts, 350 amps., 600 revs., nearly new. Prices on application or can be seen at any time—The Sun Engraving Co., Ltd., "E" Dept., Whippendell Road, Watford. 4741

NAMEPLATES, Engraving, Diesinking, Stencils, Steel Punches.—Stilwell & Sons Ltd., 152, Far Gosford Street, Coventry. 14

NEW Metro-Vickers Vertical Induction Motor, 7 h.p., 3-phase, 50 cycles, 400 volt, 408 r.p.m., spindle dia. 1⅞".—Box 4935, c/o The Electrical Review.

NUMBER of plating and anodising Generators for sale, 350 to 1,600 amps.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 114

ONE Motor Generator, input 220 v., output 30 kW, at 110 v. D.C.; 4 25-h.p., 220-v. D.C. Motors, 625 r.p.m. Apply—Denny Bros., Leven Shipyard, Dumbarton. 4979

ONE 26-h.p. Kos-Fl (Leading Power Factor) Motor by E.E.C., 440 volts 3-phase, 50 cycles, 990 r.p.m., continuous rating. Complete with Allen West Oil Immersed Starter. Price £110.—Tungstone Products Ltd., Market Harborough. 4796

PETROL DRIVEN Generating Set, output 18 kVA, 400/440 volts, 3 phase, 50 cycles, with exciter.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 113

PHONE 98 Staines. Weir Feed Pump, 8¼" × 6" × 18"; Weir Service Pump, 6,000 g.p.h.; 34-kW Browett Steam Set, 220 v. D.C.; 50-kW Hindley Steam Set, 440/220 v. D.C.; 3-throw Pump, 3¼" × 6", 700 lbs. pressure; 80-h.p. Petter Atomic Diesel; 35-kW Crude Oil Set, 220 v.—Harry H. Gardam & Co. Ltd., Staines. 60

REBUILT Motors and Generators. Long deliveries can often be avoided by purchasing rebuilt secondhand plant. We can redesign or replace surplus plant of any size. Send us your enquiries. Over 1,000 ratings actually in stock here.—Dynamo & Motor Repairs Ltd., Wembley Park, Middlesex (Telephone, Wembley 3121 (4 lines); also at Phœnix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham (Telephone, Northern 0898). 26

RECORD Minor Meggers, 500 v., new, £9 9s. 9d.—Robins Electrics, 222, West End Lane, N.W.6. 4921

ROTARY Converters in stock, all sizes; enquiries invited.—Universal Electrical, 221, City Road, London, E.C.1. 16

SEVERAL Telescopic Tower Ladders ready for essential work. Extensions, Trestles and Steps to order.—Shaftesbury Ladders Ltd., 453, Katherine Road, E.7. Grangewood 3363. 15

SIX 400-volts, 3-phase, 50-cycles Motor-driven Extractor Fans, 18" diameter.—Oldfield Engineering Co. Ltd., 96, East Ordsall Lane, Salford, 5. 4649

SMALL Universal F.H.P. Motors; keen prices; enquiries invited.—Box 8675, c/o The Electrical Review.

STOCKS for Disposal No coupons or permits required. 20 Steel Buildings suitable for factories, garages, warehouses, etc., 10c Timber Huts, all sizes; 50,000 ft. Tubular Scaffolding; 3,00c Army Blankets; 5,000 Light and Heavy Weight Mackintoshes; 3,000 gallons Hard Gloss Paint, all shades; 2,000 gallons Red Oxide and Battleship Grey; 50 Steel Lockers; 50 Filing Cabinets; 200 Canteen Tables, 500 Canteen Forms; 500 Hospital Bedsteads; 500 Mattresses; 100 tons Corrugated Sheets, galvanized and black; 1,000 Hurricane Lamps; 1,000 Elsan Closets. We also have in stock Trucks for all purposes; Chestnut and Chain Link Fencing; Concrete Mixers; Extension Ladders; Asbestos Sheets, flat and corrugated; Tarpaulins; Wheelbarrows with iron and sorbo wheels; Carpenters' Benches; Varnish; Scaffold Poles; Putlogs; Slow Combustion Stoves; Bituminous Paint; Industrial Gloves; Dust Sheets; Steps; Boiler Suits; Stirrup Pumps; Ground Sheets; Swabs; Herringbone Cloth, etc. Write for our Price List to—Cornford's, Central Works, Sudbury Circle, Sudbury, Wembley, Middlesex. Telephone, Arnold 4436 or Gladstone 3554. 4793

TELEPHONE System for 10 lines, by Automatic Telephone & Electric Co. Ltd., comprising Operating Switchboard, with 10 telephones. Suitable for use in a small factory, or on a building site. Can readily be wired up for use anywhere, and easily dismantled when required. All in first-class condition. Seen by appointment. Price £85, or near offer.—Box 101, c/o The Electrical Review.

SPIRAL Elements for electric fires, boiling rings, and other appliances, supplied to order.—Electrothermal Engineering Ltd., 270, Neville Road, London, E.7. 54

STAFF Time Checking and Job Costing Time Recorders (all makes) for quick cash sale. Exceptional condition. Write — Box 528, Smiths, 100, Fleet Street, London, E.C.4. 31

THE Beeantee Illuminations (London) Ltd., of 6, Upper Street, Islington, N.1 (Telephone, Canonbury 4555), invite your enquiries for our noted Bakelite Festoon Striplighting Holders; also our Straight-through and Crossway Connectors, Floodlights, Crowns and Animated Novelties made of metal. Large stocks of our No. 1 Holders, now available. 71

THREE 35-kVA Ruston Hornsby/Maudsley Diesel-driven Alternating Sets, radiator cooled, 230 volts, single-phase, 50 cycles, 1,000 r.p.m., complete with fuel tank, silencer and generator control panel, fitted with automatic voltage control. Modern machines in excellent condition.—Stewart Thomson & Sons (L'pool) Ltd., Gladstone Works, Fort Rd., Seaforth, Liverpool, 21. 43

TRANSFORMER, pole mounting, 50 kVA, 6,300/400/230, 50 cycles, by Hackbridge, new 1942, perfect. Price £55 f.o.r.—Electric House, Borth, Cards. 4959

TWO 23-kW Diesel Generating Sets; 4-cyl. Pelapone engines coupled to 230-volt generators, with switchboards, 1934.—Reed Brothers (Engineering) Ltd., Bevis Marks House, E.C.3. Avenue 1901/5. 4850

WATER Tube Boilers in stock. Two 25,000 lbs. evap., 250 lbs. W.P.; One 25,000 lbs. evap., 175 lbs. W.P.; Two 20,000 lbs. evap., 175 lbs. W.P.; Two 16,000 lbs. evap., 190 lbs. W.P.; One 12,000 lbs. evap., 200 lbs. W.P.; One 9/10,000 lbs. evap., 200 lbs. W.P. We install complete, including brickwork. Economisers, pumps, piping valves, generating sets and motors in stock. Please send us your enquiries; we can give immediate delivery.—Burford, Taylor & Co. Ltd., Boiler Specialists, Middlesbrough (Telephone, Middlesbrough 2622). 32

WE invite your enquiries for all types of Transformers up to 50 kVA. Send full details of your requirements to—The Nelson Engineering Co. Ltd., Netherfield Road, Nelson, Lancs. Tel. 1545/6. 4788

1 Parkinson Electric Motor, AC., 35 h.p., 725 r.p.m., 3-ph., 50 cycles, 400 v., 48 amps., complete with Ellison starter; 1 Brooks Motor, 50 h.p., 400 v., 50 cycles, 3-ph., 1,000 r.p.m., complete with Ellison starter; 1 B.T.H. Induction Motor, 50 h.p., 400 v., 50 cycles, 3-ph., 68 amps., 725 r.p.m., complete with starter; 1 Westinghouse, D.C. Motor, shunt wound, 11 h.p., 460 v., 760 r.p.m., with starter; 1 Phœnix D.C. Motor, 25 h.p., 900 r.p.m., 460 v., complete with starter. The above motors are all in good condition and guaranteed.—Wm. Sykes & Sons, 74, Bondgate, Darlington. 4972

1 Spot Welder, 1 or 2 kVA, for 230 v., 1-ph., 50 cycles supply; 1 Transformer, 1 kVA, input 230 v., 1-ph., 50 cycles, output various tappings from 180-260 volts; 1 Ammeter, scale 0-1, and 1 Voltmeter, scale 0-300 or 150-300, both for A.C.—Box 8649, c/o The Electrical Review.

3 15-h.p., 400/3/50, 1,000-r.p.m.; 1 20-h.p., 400/3/50, 1,000-r.p.m. Slip Ring Motors, with starters, complete, £200.—Scott, Electrical Engineer, Chard. 8592

50 kW, 220-volt, Diesel-driven Generating Set, consisting of 80-b.h.p. Allen 3-cylinder, vertical cold start Diesel Engine, new 1934, speed 400 r.p.m., and direct coupled to 50-kW, 220-volt compound interpole Allen Generator, mounted on combination baseplate, and complete with Switchboard.—Box 121, c/o The Electrical Review.

60 h.p., 400/3/50, 960-revs. S.R., E.V., Crompton Parkinson (ball bearings) with Allen West O.I. Control Gear.—Greenhalgh Bros., Burton's Field Mill, Atherton. 4918

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THE proprietor of British Patent No. 511815 (Discharge Lamps) is desirous of entering into negotiations for the sale of his patent or for the purpose of granting licences for the use of the invention. Will those interested please communicate in the first place with the patentee's agents, Hughes & Young, 7, Stone Buildings, London, W.C.2, who will give all information. 4941

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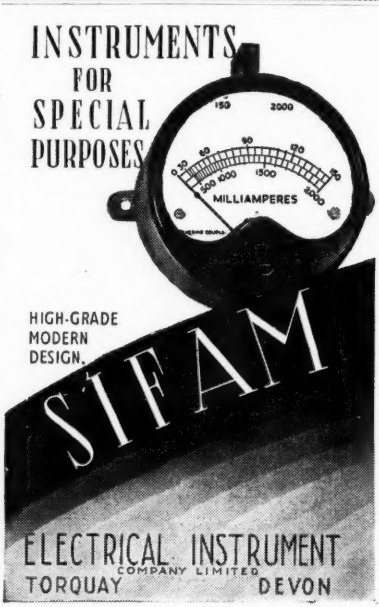

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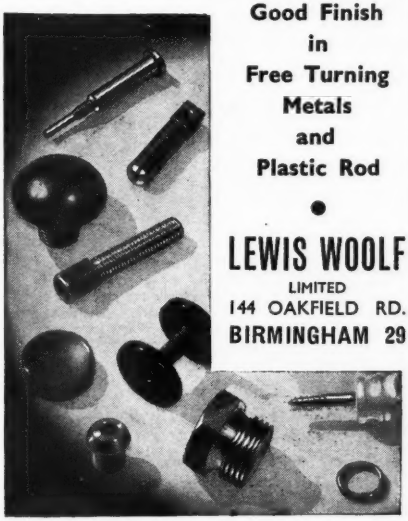

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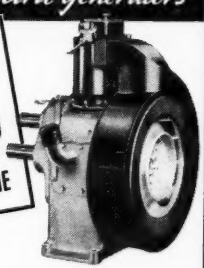

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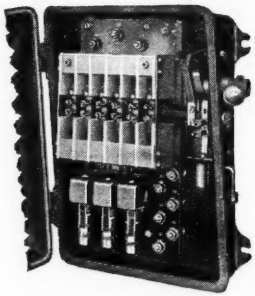

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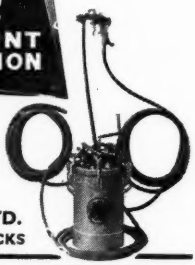

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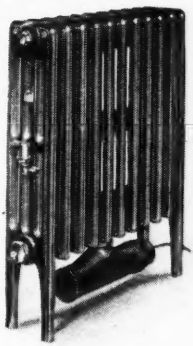

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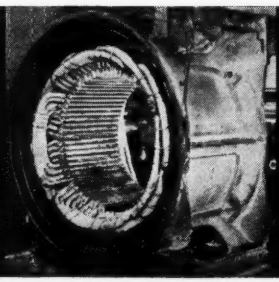

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